

SEPTEMBER 23, 1943

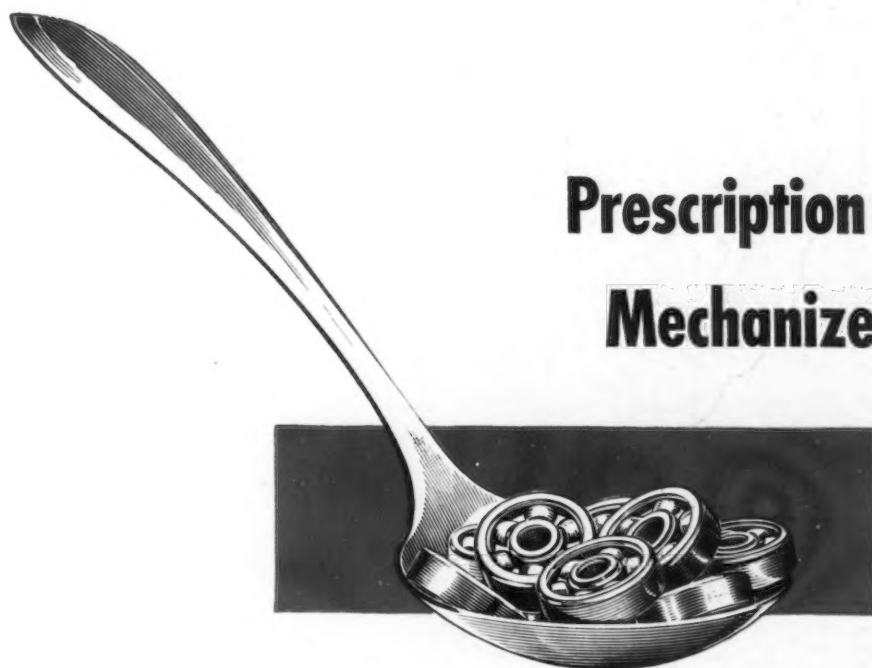
The

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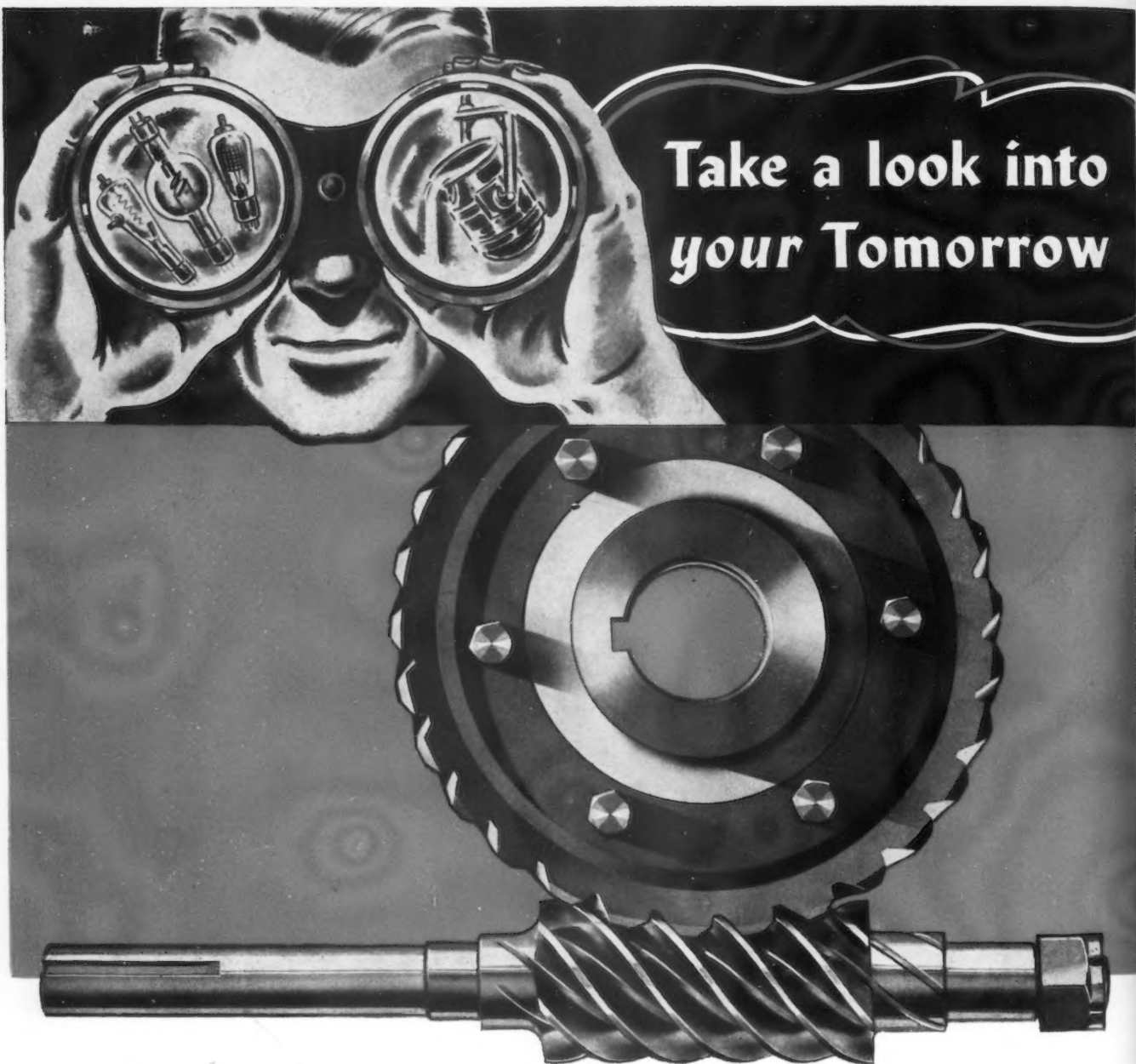


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Indexed in the Industrial Arts Index. Pub-
lished every Thursday. Subscription Price
North America, South America and U. S.
Possessions, \$8; Foreign, \$15 a year.
Single Copy, 35 cents. Annual Number, \$2.

Cable Address, "Ironage N. Y."

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This Week in The IRON AGE

Vol. 152, No. 13

September 23, 1943

Editorial

Why Can't We Have It? 35

Technical Articles

Silver Alloy Brazing 38
A Heat Treater Looks at Tool Design 45
Screw Machine Steels as Alloy Steel Substitutes 46
Centralized Grinding for Single-Point Tools 51
Effects of Cold Drawing on Welded Steel Tubing 53
Making Carbide Tipped Flat Boring Cutters 54
Pressure Welding of Heavy Tubing 56
Induction Heater Speeds Tube Forming 58
New Equipment 60

Features

News Front 37
Assembly Line 66
Washington 70
West Coast 74
Fatigue Cracks 78
Dear Editor 80

News and Markets

Iron and Steel Engineers Discuss War Problems 106
OPA Amends 250 Price Orders 108
OPA Completing Advisory Set-Ups 114
Broadened V Loan Plan Aids War Contractors 118
Personals and Obituaries 134
Machine Tools News 136
Non-Ferrous Metals News and Developments 138
Non-Ferrous Metals Prices; Scrap Prices 139
Iron and Steel Scrap News and Prices 140
Comparison of Prices by Year 142
Finished Iron and Steel Prices 143
NE Steel and Warehouse Prices 144
Stainless Steel, Tool Steel Prices 145
Semi-Finished Iron and Steel Prices 145
Pig Iron Prices 148
Ore and Coke Prices 149
Ferroalloy Prices 150

Index to Advertisers 195

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The IRON AGE

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Why Can't We Have It?

LET'S consider our postwar problem objectively.

With 10 million of our most capable potential producers in the armed forces and hence out of the production picture, we are producing a volume of goods in this country well over 50 per cent greater than pre-war per capita consuming power was capable of supporting. When those of these 10 million who survive return, where are their jobs coming from?

Federal Works Administrator Philip S. Fleming has asserted that this country must place upon the government its chief reliance for high employment after the war. Here is high authority doffing its hat to a regimented future economy.

But how can even government hope to finance consumption and hence employment on a high level when since 1932 it has been putting us into the hole of debt at a progressively increasing rate which if measured by \$30 million a mile would bring us out at China—and its standard of living—some time early in 1945?

No, government can't keep that wolf from our doors. The only thing that can is for private enterprise, working on a self-liquidating, profit-making basis to underwrite adequate postwar employment.

Good men are working on that problem. The Committee for Economic Development, which is headed by Paul Hoffman, for example. These experts have figured that if private enterprise is to do the job, it will have to find a way to move 50 per cent more goods and services than were moved before the defense and war programs began.

Of course we cannot hope to start out the day after peace is declared and sell 50 per cent more than we did before the war began. Certainly not in the line of industrial equipment. Government will have to help bridge the gap for a period of perhaps two to five years. Bridging the gap by going even deeper into the hole of debit financing of production.

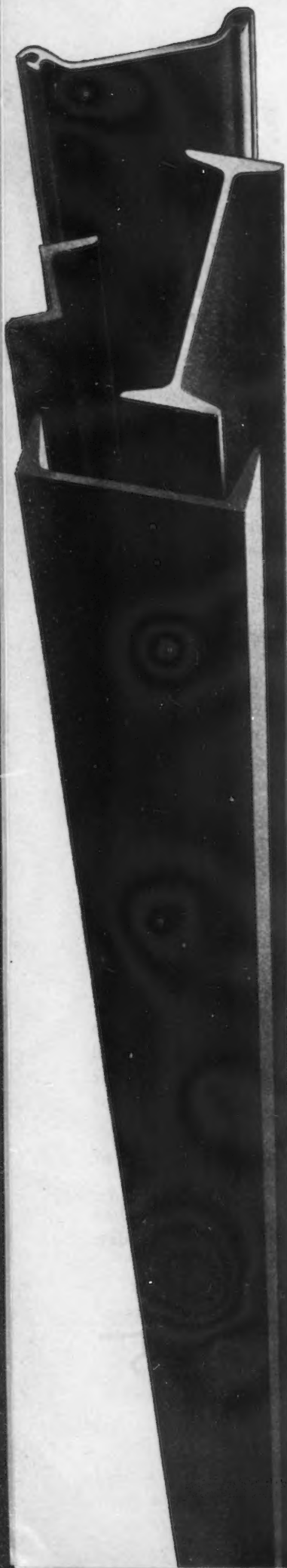
The most ardent advocate of private enterprise versus government bureaucracy recognizes this fact.

The big point is that during this interim, government should help finance private enterprise, not compete with it. And that government should have the intent to withdraw from activities foreign to pure government and shift the burden to private industry just as fast as the latter is able to shoulder it.

What we do not want is government to have the intention of increasing and not diminishing its functions as an employer.

The expression of such intent, by an authority even higher than Administrator Fleming, is something that this country needs today. Why can't we have it?

J. H. Van Deventer



This temporary bridge on the upper Liard River will be replaced by a steel span.

Bridges to Japan

"Bridges to Japan" are being fabricated from Inland plates and shapes, and shipped, along with Inland sheet piling, to sites on the 1670-mile Alaska Highway.

Pushed through in record-breaking time, this strategic highway is now being completed for the transportation of important military supplies to our Alaskan outpost.

The original bridges and piers on the highway were built largely of timber from surrounding forests. These temporary structures are being replaced now by bridges of steel. The new permanent bridges are built not only to withstand heavy military traffic during the war but to assure safety when the highway is opened to commercial and tourist traffic later.

These "Bridges to Japan" are but one of the many ways in which Inland steel is used in helping to win the war.



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● Illustrating changes in production emphasis caused by the fluidity of war is the listing of the 57 mm. gun as a critical item. Maximum output has just been ordered, as the result of experience in Sicily and Italy. In Sicily, 46 percent of these anti-tank weapons put into action were lost.

● The Thompson sub-machine gun is being replaced by the M-4 7½-lb. sub-machine gun for general combat use. The M-4 is constructed of stamped metal parts except for the barrel and firing mechanism, and its simplicity of design and operation resembles the British Sten.

● Best down-to-earth estimate of battle scrap imports for the remainder of the year is 20,000 tons a month. The excellent scrap yards in Sicily and Italy could well be used to prepare battle scrap prior to shipment here. This would save shipping space, labor here, and would give work to demobilized Italians.

● Maritime Commission has a goal of 35 percent women in shipyards, about equal to the British level. One Portland yard, far ahead of others, is up to 30 percent.

● Experiments with green sand molds for centrifugal castings are opening new possibilities of substantial cost reductions in spun castings.

● Labor people consider one of the sharpest stings of the Smith-Connally law the prohibition against political contributions by unions. One radio station, in an extreme interpretation, has denied UAW vice-president Richard Frankenstein paid radio time for a political action speech.

● A Government spokesman's recent widely publicized statement that the U.S. is turning out more aircraft than all the remainder of the world put together may be good propaganda. But, good as U.S. production is, it's still far from that good.

● All American combat units are now supplied with the shorter, lighter and sturdier bayonet, which measures 10 in., as compared with the previous 16 in. The new bayonet saves 362 tons of high carbon steel in 1943, and an estimated 560 tons in 1944.

● U.S. Fragmentation bombs are built up of a steel cylinder containing TNT, around which is wound a rectangular iron rod, which on exploding breaks into about 1500 pieces (last war's cast or forged fragmentation shell broke into 300 pieces), of about 0.3 oz. average weight, having velocities up to 4000 ft. per sec.

● And: Each bomb carries a parachute to enable low flying bombers to escape the fragments. The greatest demonstration of such parachute bombing was in the Battle of New Guinea, when the Japanese were cut to pieces on the Owen Stanley Range.

● Composite wooden aircraft used by the Russians were recently analyzed and commented on by the German magazine Luftwissen. Exceptionally high tensile and compression figures were obtained for compacted birch spars bonded with phenol-formaldehyde resin, taken from the Russian Lagg-3 single-seat fighter.

● At the past year's rate, it will take Smaller War Plants Corp. just about six years to lend small business the first round on its \$150,000,000 capitalization. The 462 loans made since last October total \$22,354,858.

● The alloy steel turnings problem remains unsolved, with 55,000 tons of the 140,000 tons produced a month lost through improper segregation. Present inventory of alloy steel turnings is a three-month's supply; WPB would like to make it 12 months'.

● German economists, in recent articles, have frequently used the phrase "Die Decke ist zu kurz" ("The cover is too short"), a subtle phrase not too hard on morale, but which means lack or even scarcity of materials. A recent survey of German aeronautical potential came to the conclusion that no new types of aircraft can be expected in this war.

● Luftwaffe type policy has for some time been towards the multi-purpose airplanes. Fighters are designed and used as light bombers; bombers as night or long-range day fighters, etc., etc.

● German people are beginning to ask, "Where is our fighter reserve?" Propagandists, anticipating this question, are beginning to talk of the enormous increase in output over the past year, and introduced a carefully conceived mouth-to-mouth campaign on large fleets of airplanes "somewhere in Germany" waiting for "The Day".

Silver Alloy Brazing with High-

THE combination of silver alloy brazing with fast, localized heating supplied by recently developed ceramic gas-air burners makes possible a new, swift, continuous, cheap method of joining metals, a method flexible and adaptable enough to use economically both on products to be made in large quantities over long periods of time, and products subject to frequent redesign or short contracts. Techniques and equipment for this method of production-line joining have largely been worked out during the past year on war production items.

The essentials are: time, temperature, the placing and control of heat sources, and (in order not to damage the metals being joined) a brazing

alloy which melts uniformly at relatively low temperatures. The burners used for the brazing methods described here are new Selas types assembled from precisely molded ceramic parts of remarkable refractory and insulating qualities, and supplied with accurately premixed city gas and air under pressure. The brazing alloys used are Handy & Harman's Easy-Flo, for joining ferrous, non-ferrous, and dissimilar metals; and Sil-Fos for joining non-ferrous alloys exclusively.

An example of the method applied to parts in limited production is the work done by Lightolier Co., Jersey City, makers of marine lighting fixtures which must be able to withstand the vibratory shock caused by a 16-in. shell. Fig. 1 shows 16 of the company's fixture parts, with a total of 38 brazed joints.

Lightolier estimates that radiant and superheat gas heating methods

have quadrupled production in cases where other methods had formerly been used, although many of the joints were never attempted in any other way.

The company's localized gas heating equipment consists of six large radiant ceramic-cup burners, 12 small superheat burners, six manifolds of smaller ceramic-slot burners in line, and one gas and air mixing machine capable of delivering 3500 cu. ft. per hr. of carbureted combustion mixture at 3 lb. per sq. in. pressure. Figs. 2 and 3 show two of the principal production methods used. The large turntable (Fig. 2), which is of emergency construction with a transite top supported on cut lengths of plumbing pipe and furniture casters, has 12 stations in sets of four, with three 120 deg. moves making a complete cycle. While four parts are being brazed under the four radiant burners, four are cooling and four are

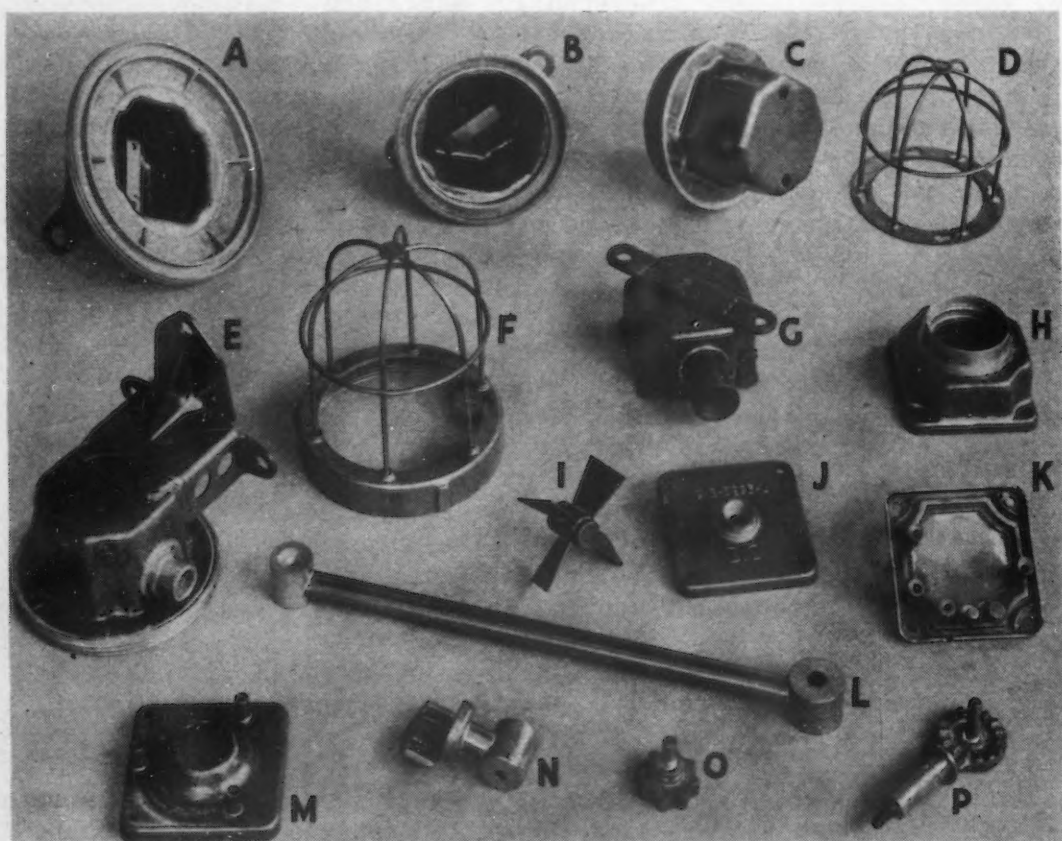


FIG. 1 — Marine lighting fixture parts, showing 37 of 38 brazed joints made with one flexible gas-air setup. These parts must be able to withstand the vibratory shock caused by a 16-in. shell.

Speed Localized Gas Heating

By J. I. BUTZNER
Associate Editor, THE IRON AGE

being unloaded and loaded. One girl loads, unloads and turns the table with indexing stop. Three girls assemble the parts and apply flux and brazing alloy.

The parts (A, B and C in Fig. 1) are brazed at the rate of 300 an hr., with output for the four girls about 1850 in an 8 hr. day. The brazing itself takes 48 sec. Stations are jigged to take several models of work-pieces. The burners for this table use 300 cu. ft. of gas an hr., a fuel cost of 15c. an hr.

With induction heating, which was formerly used for certain of these parts, brazing took 43 sec., one part was brazed at a time, and two girls did 560 parts a day.

The company also uses two of the small turntables (Fig. 3) each with six ceramic-lined superheat burners evenly spaced around the circumference. The burners are supported on laboratory ring stand fixtures, and

... Gas-air brazing, with advantages of fast localized heating and exceptional flexibility, has been widely developed during the past year on war production items. Techniques and equipment for this method of swift production line joining are here described.

can be raised or lowered, turned so that their heating slots are at any angle, and moved nearer or farther from the part being brazed. One girl operates both tables, with two girls, in most cases, preparing the parts for brazing.

The part being brazed in Fig. 3 (F, Fig. 1) is a bulb protector with six legs, all simultaneously brazed to the support with the turntable kept stationary. The legs are set into holes in the ring, no jig is required, and brazing is accomplished in 24 sec. This is in contrast to another type of protector (D, Fig. 1) for which the legs are set directly on a ring, rather than in holes, making a jig

necessary. Absorption of heat by the jig extends brazing time to about 1 min.

In brazing protectors of the first type, with the heavy base, the burners are directed at the base below the braze, partly to prevent blowing away of the tiny brazing alloy rings, but mainly to bring the heavier base section to proper heat equally as rapidly as the light leg sections and the brazing alloy itself.

In all cases of brazing with aimed or localized heat, this is an important factor. Easy-Flo has a solidus of 1160 deg. F., a liquidus of 1175 deg. It is necessary not only for the brazing alloy to reach brazing tem-

FIG. 2—Large turntable used in brazing marine lighting fixture parts, either positioned in slots or held by special jigs on the 12 stations. Four parts brazed at a time while four others cool, and loading and unloading takes place on four other stations.





o o o

LEFT

FIG. 3—One of a pair of small turntables tended by one operator. In handling this piece the table is stationary while the six radiant gas superheat burners are directed on six bulb protector joints. In other cases part rotates at 5 r.p.m.

o o o

surmounted by a threaded brass ring. All three parts are placed on and around a steel jig consisting of a base and center column. The jig base is undercut so that cold metal does not lie under the bottom braze itself. The jig center column is deeply fluted for minimum contact with the parts being located.

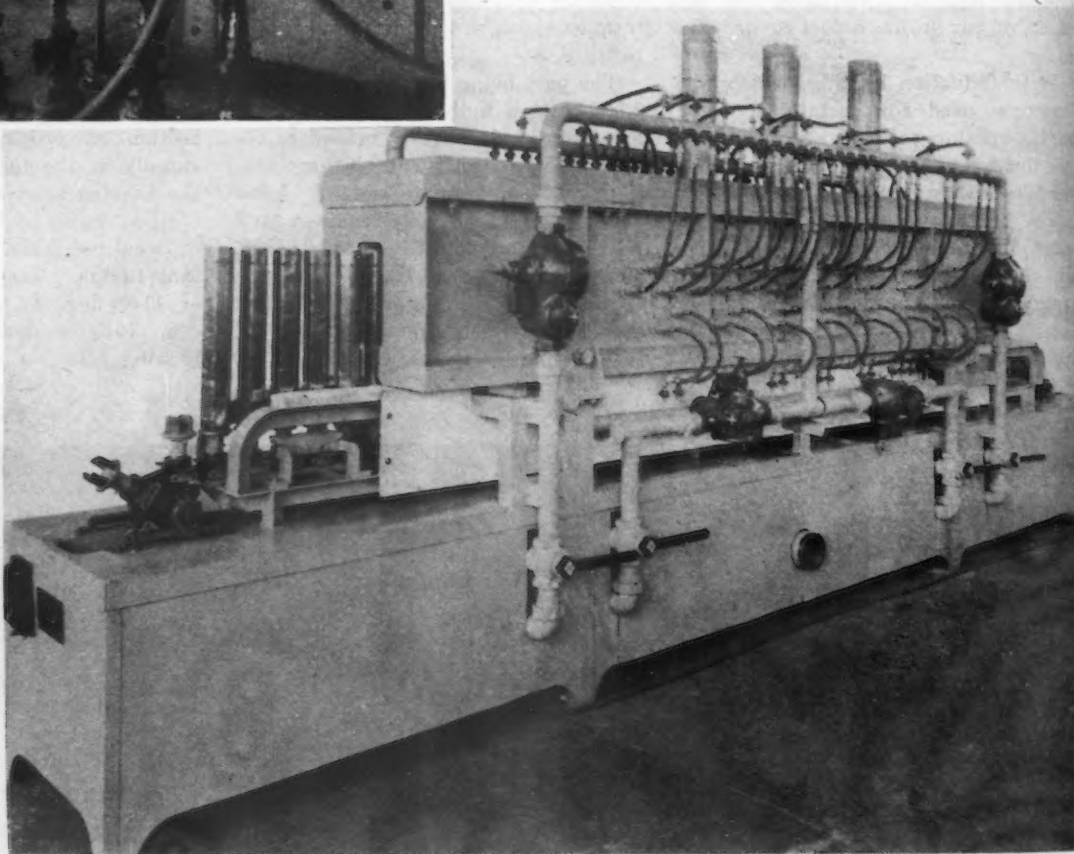
Two burners are directed at the top braze, for which a pre-formed ring of Easy-Flo brazing alloy is used. The other four burners around the turntable are set at angles around the bottom braze, to which a brazing alloy wire is hand fed. The two top burners are pulled back 1 in. farther than the four bottom burners both because of the lighter top section and the better heat conductivity of brass. Both brazes are thus com-

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RIGHT

FIG. 4—Dual purpose machine for brazing and annealing of incendiary bomb cases. After passing through a pre-heat zone where the flux is dried, the assemblies are brazed at 1200 deg. F., subsequently reaching 1450 deg. F., to a point 10 in. down from the top of the case, for annealing. The bottom few inches of the case are not affected.

o o o



perature, but also for the metal on both sides of the braze to reach it, and practically simultaneously. The same principle holds, of course, for brazing alloys with higher or lower melting points. Because of this, the burners are rarely directed precisely at the braze itself, but rather on the heavier of the assembled sections. For the same reason, the distances of burner faces from the assembly joints are frequently differential, examples of which will be shown later.

Wherever possible, the use of jigs should be avoided because of heat absorption, as illustrated by the two types of bulb protectors referred to above. Where jigs are necessary, they should be designed to minimize heat absorption. An example of such a jig is that used for a cover box (H, Fig. 1). Here two brazes are done at once on the same assembly, the small turntables being used. The base of the assembly is the steel cover base, on top of which is the steel box,

pleted simultaneously, at a rate of about 55 assemblies an hr.

Another typical operation done on the small turntables is the brazing of three machined posts to a socket cover (M, Fig. 1) with brazing time of 36 sec.

An instance of a part in which all brazes are not done at once is that of an alarm bell housing plate (K, Fig. 1). On the top side of this part, shown in the photograph, a malleable iron forging is brazed to a 3-in. sq.

stamped steel case in 40 sec. About 4 sq. in. of surfaces are brazed. A previously applied boss, also brazed, on the underside of the stamped part is not melted off during the brazing of the forging because the underside of the piece remains cooler than the top.

Another scheme of assembly is used for ratchet swivels for desk lamps (P, Fig. 1) which are held eight at a time in a rack while the two screw studs are brazed in slip-fit holes. Eight superheat burners on a manifold are held at an angle against the swivel stem sides, below the braze point, where the metal is heavy. Axial screw-studs are brazed on with the parts lying flat in a row on a transite slab, the same manifold with eight burners held over them.

work, with minimum loss through a $3\frac{3}{4}$ in. wide bottom slot opening. Only 5 min. for heating up the unit to start production is required.

Each of the parts weighs about 5 lb., of which $3\frac{1}{2}$ lb. is heated. The present production rate, using only every other station, is 600 an hr. at a gas cost of about 65c. an hr. A production rate of 1200 per hr., has been shown practical. The assembly consists of a heavy outside hexagonal tube 3 in. across flats, in the top of which is inserted a thin-section hexagonal, open topped cup. Inside this is inserted a thick-section, open bottomed cup, the two cups forming a cell or capsule about 2 in. deep. The work is prepared by inserting the cap assembly into the tube end after fluxing, then laying brazing alloy wire

on top of the joint. In the pre-heat zone the flux is dried so it does not boil and spatter burners. After the assembly has progressed into the heating zone and has attained 1200 deg. F., the brazing alloy flows by capillarity into the joints on either side of the thinnest drawn cup. Further on in the heating zone, at 1450 deg. F., the entire assembly and tube are annealed to a point 10 in. down from top. Thereafter slow cooling occurs to the point where the parts are manually removed.

The application of the brazing alloy in this assembly is particularly noteworthy. Two shaped Easy-Flo wires, each slightly longer than half the top circumference, are placed on the joint so that their ends overlap one another. The overlapping occurs at a point where an excess of brazing alloy is desired because the assembly wall is subsequently drilled and tapped at that point for insertion of explosive.

It should be noted that in all cases, joints to be silver alloy brazed should be closely fitted. Fig. 5 shows the relation of joint thickness to tensile strength (based on butt joints in stainless steel) and as indicated by the curve, joints of a thickness of about 0.0015 in. achieve maximum strength, with joints of 0.003 in. thickness highly satisfactory.

An instance in which localized gas heating with six Selsas ceramic-confined-combustion burners solved a rather baffling production problem was in the assembling of bronze deck drain pots for ships. It was necessary to braze a steel ring $1 \times \frac{1}{4}$ in. in section around the top of a 4 in. diameter pot with a $\frac{1}{4}$ in. cast bronze wall. When it was attempted to braze the assembly by whole-part heating within a furnace, the two joined sections pulled apart on cooling. There is divergence of opinion as to whether this was caused by dif-

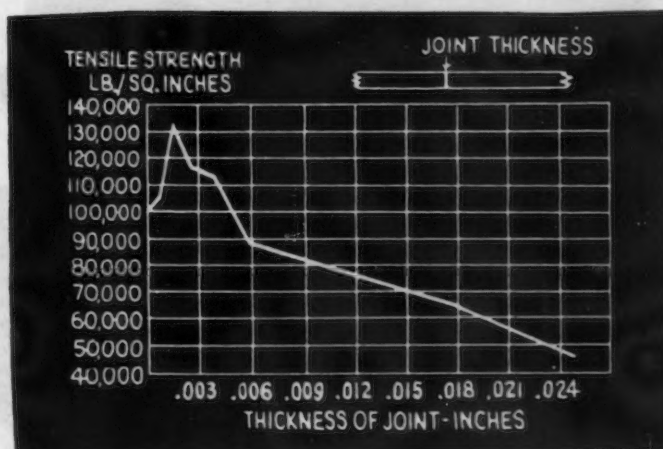


ABOVE

FIG. 6—Brazing cemented carbide tip on tool. Each of the two burners uses 45 cu. ft. of pre-mixed city gas and air per hr. The un-assembled parts, including cut and shaped brazing alloy shims, are shown in the lower right hand corner.

RIGHT

FIG. 5—Relation of joint thickness to tensile strength, based on silver brazed butt joints in stainless steel.



At the opposite pole from the Light-olier emergency constructed equipment is the Selsas built dual purpose automatic machine (Fig. 4) used by Stanley Works for brazing drawn cap assemblies into the ends of hexagonal seam-welded steel tubes and simultaneously annealing the cap end and the upper half of each tube. The machine, used in this instance in the continuous straight-line production of incendiary (oil) bomb cases, is adaptable to numerous heat treatments of cylindrical metal products.

Ninety-two radiant cup gas burners stud the walls and roof of a removable tunnel, which lets down over a progressing line of individually rotating pieces. The bulk of the heat is radiated to the upper half of the

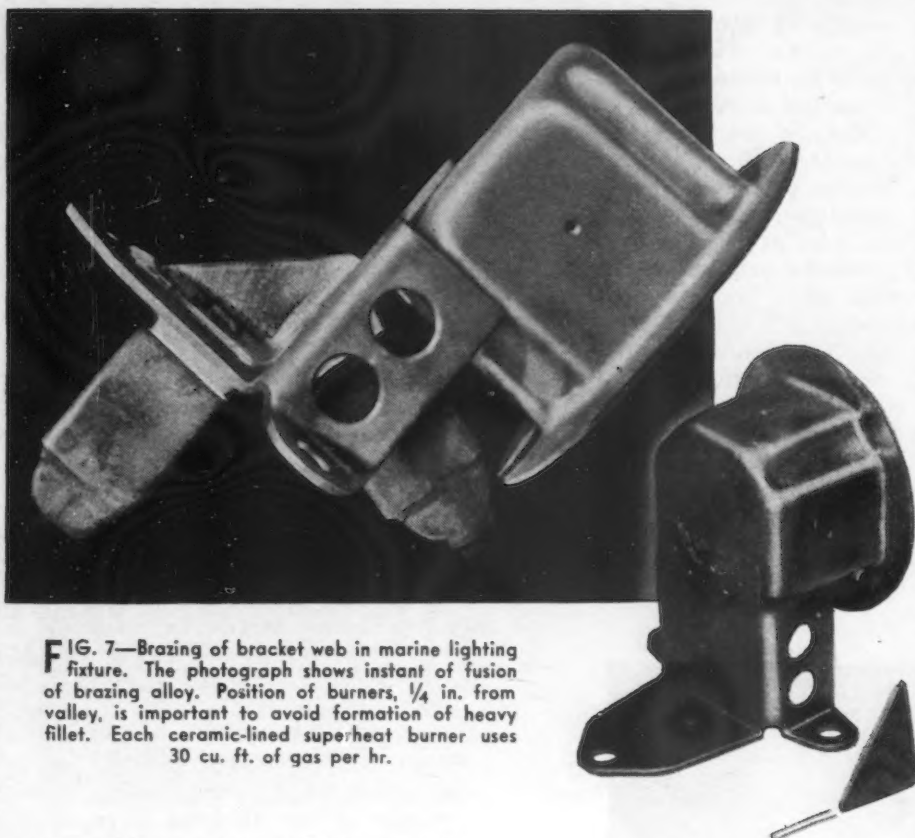


FIG. 7—Brazing of bracket web in marine lighting fixture. The photograph shows instant of fusion of brazing alloy. Position of burners, $\frac{1}{4}$ in. from valley, is important to avoid formation of heavy fillet. Each ceramic-lined superheat burner uses 30 cu. ft. of gas per hr.

ferential expansion of the metals (and consequent stretching of the steel ring) during heating, or whether not enough flux was used for the prolonged furnace heating. None the less, the parts are now being satisfactorily

brazed in 45 sec. each, during rotation, within a ring of high-speed localized heat sources.

A technique of heat application in which a single radiant-cup burner is

placed under, and is completely surrounded by, the part being brazed has been used by American Meter Co. Here $\frac{1}{4}$ in. cast steel nose adapters are brazed to 16 gage steel noses of incendiary bombs. After flux is applied around the hole at the summit of the cup shaped nose, both the adapter and the alloy ring are pressed into place. Pressing of the brazing alloy together with the adapter facilitates the "running in" action of the braze. The assembled nose is placed over the burner for 45 sec. One girl prepares parts, another tends the burners, with a production of 1000 assemblies in an 8-hr. day.

After brazing, oil at 400 lb. pressure and 120 deg. F., is applied against the inside of each nose, which raises up the flattened apex without the braze giving. Only 0.1 per cent (1 in a 1000) leakage of joints has been found.

An experimental setup for silver alloy brazing with gas heating is used at General Electric Co.'s Philadelphia plant. The apparatus consists of a 24-in. diameter ring manifold supported on four legs. Flexible tubing connects each of ten superheat-slot burners to the manifold. Burners are held by arms with universal couplers, permitting raising, lowering, horizontal movement, twisting, and setting at angles. The apparatus is sufficiently flexible so that almost any part can be brazed in it experimentally.

This company has done considerable work in brazing of circuit breakers which have been newly designed to use less copper. In one instance, heavy bar copper coils are brazed to two copper terminal blocks, one block $6 \times 1 \times \frac{1}{2}$ in., the other $2 \times 1 \times \frac{1}{2}$ in. A jig grips the small terminal block in a horizontal position; the large 6-in. block is jugged vertically. The jig which grips the small block comes in contact with the braze and hence is covered with a compound to keep the braze from penetrating it. Two small burners are directed on the small block; one big and two small burners on the large one. The brazing time is 80 sec., with 20 sec. for cooling. Timing is automatic. The burners are held rigidly in position, and the assembly in the jig is slid between them on a guide rail. Formerly the brazing was done with hand torches, one braze at a time, at one-fourth the present production rate.

In some of these assemblies, it is necessary to silver plate sections on the two blocks. Practically the only way to do this after assembly is to

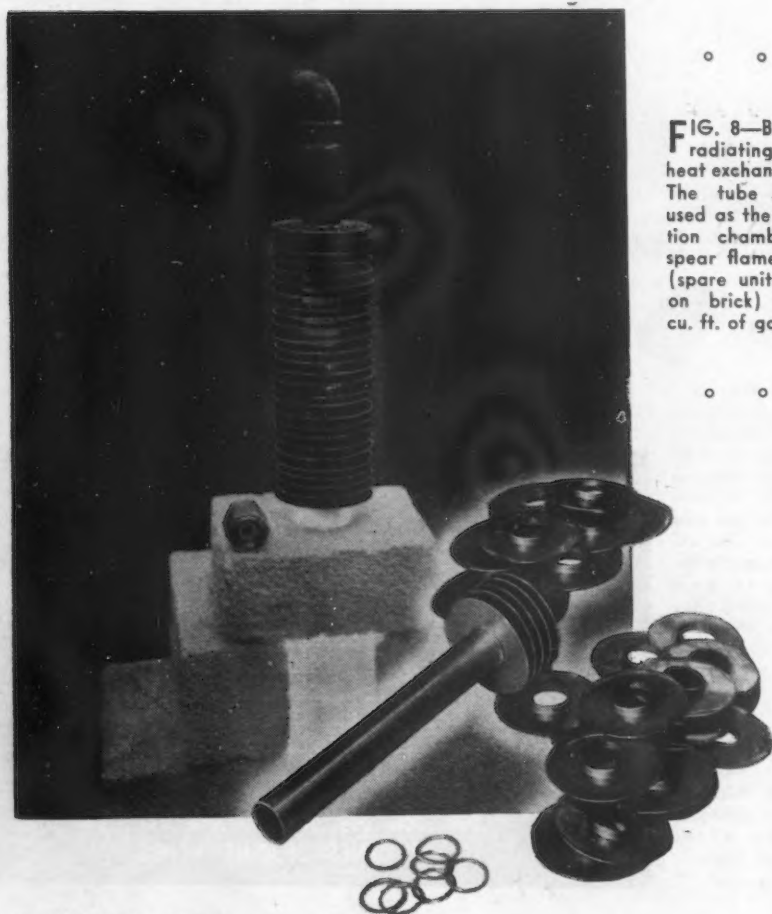


FIG. 8—Brazing of radiating fins to heat exchanger tube. The tube itself is used as the combustion chamber. The spear flame burner, (spare unit is lying on brick) uses 70 cu. ft. of gas per hr.

silver plate the whole part. However, it has been found possible to plate the sections on the two blocks before assembly, even though at one point the plating actually comes in contact with the subsequently made braze. Blistering is prevented by chilling the plated part, while brazing takes place, with a heavy block of steel internally water cooled.

Simultaneously with brazing, the coils in these assemblies are annealed so that they can be moved more easily for applying insulating coating. The blocks are not annealed.

When other types of coils are brazed, of course other jigs are used and the burners are differently directed. Hence the whole assembled brazing unit, including burners and guide rail, is designed to be lifted in and out of the working table. A main carbureted gas-air supply pipe makes one connection with the entire burner assembly.

At General Electric Co.'s Pittsfield plant, a relatively massive piece of work is the brazing of brass and copper rods to brass end plates for motor pole pieces. The end piece is $\frac{5}{8}$ in. thick, seven middle rods are in cross-section $\frac{3}{8} \times \frac{5}{8}$ in., and two round end rods are $\frac{9}{16}$ in. in diameter. The three center rods are copper. For making these nine brazes are used above, and one below, the endpiece. A roving superheat burner to be moved by the operator if and where needed to accelerate braze fusion and flow at lagging points was at first installed, but has not been necessary.

Brazing of rods to one endpiece takes $4\frac{1}{2}$ min. The jig holding the rods and endpiece is on a swivel, and when brazing of one end is finished, the jig is swung around, bringing the other end of the assembly into position for brazing and dunking the brazed end into a quench tank. The whole operation, including assembly in the jigs, takes 25 min. In some cases the rods spring a little, leaving a hole between the brass plate and the bars, which is filled in later with acetylene torch and a stick of alloy. This touching up requires about 30 sec.

With the use of city gas in the new high-speed setup, the fuel cost for a complete pole assembly is 1.96c. Cost of acetylene, including handling of cylinders, was 19.4c. for a complete pole. This concurs with records from another manufacturer of steel products who reports 4c. fuel cost per 100 joints with a gas-air production setup.

Another use to which the radiant gas method of brazing has been put is the replacing of worn cemented



FIG. 9—Small steel bushing and large bronze bushing simultaneously brazed to steel electric control box cover. As indicated by the dotted lines, faces of burners are held 2 in. above work to prevent too rapid heating and warping of cover. Each of the six burners uses 30 cu. ft. of gas per hr.

carbide tool tips. The technique used, which was developed by Selas Co. and the central tool department of Midvale Co., Philadelphia, is illustrated in Fig. 6, which also shows in the lower right hand corner the two

pieces of shaped brazing alloy sheet used. On small tools the vertical strip of alloy is generally omitted.

Midvale reports it can now remove a worn carbide tool tip and replace it with a new one three to four times as quickly as by any previous method. Fuel costs have been reduced 75 per

FIG. 10—Heat exchanger tubes being joined to heavy cast header. The photograph, taken at the instant of fusion of the brazing alloy rings, illustrates an instance in which the entire heat is directed on the heavier of the two joined parts. Each of the four superheat burners uses 50 cu. ft. of gas per hr.



cent. In some instances a higher temperature bronze bond is used in lieu of silver alloy, an arrangement made possible because of the intensified local heating. As in all instances in which the radiant gas heating burners are used, the extremely high rate of heat transfer is obtained by using high pressure of fuel at the burner, combusting fuel in multiple jets along accurately shaped ceramic surfaces which attain high incandescence, compacting the combustion into a small space with no impingement of the burning gases until combustion is complete, and the exclusion of cooling and diluting secondary air from the combustion gases. Midvale noted that because the velocity of the burning gases is largely dissipated within the burner cup, there is no blasting over the tool.

Time for brazing the tool tip shown in Fig 6 was 2½ min. The distance of the burner faces from the work is ½ in. For odd shaped tools, the burner spacing on the two sides may be unequal so that the whole joint surface attains brazing temperature at the same instant. For the tool illustrated, 0.005 in. thick Easy-Flo was used.

Fig. 7 illustrates particularly well the necessity for the proper direction of heat. The stock thickness for this part, a marine lighting fixture bracket web, is 16 gage, and the braze is accomplished in 20 sec. The two superheat-slot burners are held along

the line of the braze, ¼ in. away from the valley where a heavy wasteful fillet of silver alloy would collect if the valley were directly heated. With uniform heating, the two hair-pins of 1/32-in. diameter Easy-Flo wire fuse all at once. The same part less economically brazed by another heating method, is shown at E, Fig. 1. Note the heavy silver alloy fillet.

In Fig. 8, illustrating the brazing of fins on a heat exchanger part, the heat exchanger tube itself is used as the combustion chamber, with an outlet into a refractory enclosure which is adjustable so that even heating along the length of the tube is attained. The stainless steel tube has a ¾ in. O.D. and a 1/16 in. wall. The radiating fins, stamped from 1/32-in. stainless steel stock, have internal flanges to space the fins automatically, hold them during brazing, and afford a good fit for capillary metal flow over the entire tube area. The brazing rings are pre-formed of 1/32-in. diameter Easy-Flo.

A ceramic-port spear flame burner is used; the spare unit lying on the brick shows the port construction. Brazing time is 45 sec.

After brazing is completed, the tube has in reality three walls; the tube itself, the uniformly distributed brazing alloy, and the fin flanges.

Bronze to steel and steel to steel are brazed simultaneously on the 18 gage steel electric control box cover shown in Fig. 9. The large bronze

bushing has a flange on top, but the small steel bushing has a bottom flange, making necessary peen crimp marks at four points around the hole to grip the bushing against gravity during brazing.

In use, the face of the compact radiant burner nest of six cups is 2 in. above the work, as shown by the dotted lines, so that heating will not be too rapid and warp the cover. Brazing time is 105 sec. Preformed 1/16-in. diameter Easy-Flo rings were used.

Fig. 10, taken at the instant of fusion of brazing rings, shows heat exchanger tubes being joined to a cast header. The ¼-in. thick casting with press fit holes, having more mass than the 1/16th-in. wall tubes, is directly heated, while no heat is directed on the tubes, making it possible for both the casting and the tubes to reach brazing temperature at the same instant. The four burner slots are held ¼ in. from the casting.

An interesting application of brazing alloy is shown in Fig. 11. The 1/16-in. diameter Easy-Flo wire, pre-formed as a ring, lies in a recessed groove cut into the solid plug. Together with the plug, it is inserted into the tube. Capillarity flows the brazing alloy along the cylindrical joint surface until the head is visible all around at the base of the V groove, on the assembled part, thus making a ½-in. lap joint.

Two burners are directed at the plug, above the V groove, and two at the tube, below the groove and toward the joint. The two top burners use 35 cu. ft. of gas per hr. per burner, while the bottom burners use 30 cu. ft. per burner, an example of individual adjustability of burners to compensate for irregularities in conductive heat loss. The slots are ¼ in. from the work, which is rotated at 10 r.p.m. Brazing time is 57 sec.

Over and above the cases cited, modern gas-air brazing, with the all-ceramic "accelerated-combustion type of burner illustrated herewith, is used to braze the trailing edge of hollow steel propellers, the intricate joints of pilot tube assemblies, canister heads, and dozens of assemblies formerly riveted, threaded and screwed, welded, or spun at considerably lower speed and higher cost. Industrial imagination will range over wide fields in conceiving of future assemblies of metal products by simply "laying up" component building blocks and letting controlled localized heating bond the final unit product.

FIG. 11—Brazed joint on part for celebrated "bazooka". The brazing alloy ring is set in the groove in the solid plug, as indicated by the unassembled parts. When braze is finished, bead is visible all around at base of the V groove shown on the assembled part, making a ½-in. lap joint. The two top burners use 35 cu. ft. of gas per hr. each., the two bottom burners 30 cu. ft. each, an instance of individual burner adjustability to compensate for irregularities in heat loss.



A Heat Treater Looks at Tool Design

By A. S. EVES

Chief Field Engineer, Perfection Tool &
Metal Heat Treating Co., Chicago

I WONDER how many people realize that of all the tools designed and started through the tool room, very few ever succeed in finally reaching the job and there achieving the maximum productivity and life.

My guess is that the figure is not over 25 per cent.

From the standpoint of the professional heat treater who daily hardens many different steels and employs a wide variety of treatments, one can see that a chain of minor events, each insignificant in itself, leads to a loss of manhours and scarce materials which in the aggregate must be appalling if the total were known.

Theoretically, someone designs the tool, selects the right steel for the job and then sends the job to the tool room. Occasionally, we fear, the designer does not dwell very long on the fact that light and heavy sections are bound to expand and contract at different rates. Some loss is accounted for by distortion, or even fracture, because of such oversight. Still less often is it considered necessary in pieces of varying section to protect against cracking by the use of fillets, or by drilling a hole opposite a sharp corner, or what may be still better by making the tools in sections.

In the selection of tool steel, there simply is no excuse for calling for case hardening where the steel contains very much carbon, or using water hardening steel for delicate tools when there are so many varieties of oil hardening tool steel, or choosing an alloy steel that never was intended to be heat treated to the high degree of hardness specified in the blueprint. Or for making up stampings out of cold rolled strip, and expecting the heat treater to wave a magic wand and produce springs. Only too often such things do happen and add to the total of waste.

But there is a far greater cause of waste existing today than any of these. It is due to the fact that so

many tools nowadays are made in one department and hardened in another, or are sent out to commercial heat treating plants like our own. An ever-widening gap between the man who makes the tools or parts and the man whose responsibility it is to harden them is the serious condition which gives rise to a tremendous loss of labor and material.

In our plant we harden a couple of tons of high speed each day, and perhaps 20 tons of other tools. We are highly conscious of the fact that in order to produce the best possible job, we first must know the analysis of the steel in every tool. But for years we have been confronted with the fact that the tool maker often doesn't know, or a mixup has occurred, and the information given us with the job in 10 or 15 per cent of cases is either missing, or, worse yet, incorrect!

Hundreds of jobs are received without any kind of steel being designated. Here the only loss is a delay, but of course delays are not something easily countenanced these days. They may be felt among the fog-bound rocks of Attu or the mosquito ridden jungles of New Guinea and be paid for in human blood.

But let us disregard all that, and deal with the hundreds of cases where we are handed a job to treat and are told that it is made from a certain make and brand of steel. The job may be a simple punch and die or it may be 40,000 vital war parts. We treat it according to what the customer says it is. Obviously we can't smell it, nor taste it, nor see what kind of steel it may be. Nor is sparking a safe guide, since there are for example certain oil hardening steels that throw a spark exactly like a straight carbon steel. The trouble begins when we quench

that job and find out later (Oh how much later!) that it was an entirely different kind of steel.

The job may come out soft. Or if more than one piece, the hardness may vary from one to another. Or it may be burned to a crisp because far more heat was used than the steel ever was intended to stand.

Lots of the jobs must be re-treated again and again until some treatment is found that will approximate the specifications. But mark this clearly, those tools can not possibly be expected to be as efficient as though properly hardened the first time—while those which have been subjected to excessive heat probably are never put to work at all.

One begins to see, at least, why tools made from the same steels and used in identical fashion, often give widely different production figures. I have said that about 25 per cent of all tools made ever reach the job and do the maximum. From experience we've had during these past three years in hardening high speed, I'll go even further and say that not even 10 per cent of high speed cutting tools attain the utmost results. Last year \$400,000,000 worth of such tools were made; figure it out for yourself.

Most of the loss is preventable. Standing here in the midst of a stream of tools from all directions, we can see that some firms seldom err while others are constant offenders.

There are thousands of steels, and hundreds of treatments. For every tool and every job, there is a one best way. If we are really to get serious about this job of conserving manhours and scarce metals, some real thought should be given to the following points:

1. Design tools and parts so they only will do the job, but also

(CONTINUED ON PAGE 130)

Screw Machine Steels

THE medium carbon screw machine steels, due to their high manganese content, are comparable in hardenability with alloy steels rather than with plain carbon steels. The danger of cracking by water quenching is, therefore, removed from consideration except

where their use in larger sizes requires water quenching.

The high percentage of sulphur in the medium carbon screw machine steels will, of course, have the same detrimental effect on the transverse mechanical properties as it did on the low carbon screw machine steels.

Due to the higher carbon and manganese content of these medium carbon steels, the silicon content is not so important. It is rare that a medium carbon screw machine steel will be found deficient as to de-oxidation. Silicon is said by some to have a detrimental effect on the free machining properties. It is certainly true that if the silicon is present, as a silicate inclusion, it will have an abrasive effect on the cutting tools. However, in order to obtain a steel which has a consistently sound macrostructure, that is, a steel that will meet a deep etch test requirement, a silicon content of 0.15 to 0.30 per cent is desirable. A survey of 121 heats of steel failed to show any increased hardenability by segregation into two groups, one representing steels containing under 0.15 per cent silicon, and the other which contains 0.15 to 0.30 per cent silicon.

The medium carbon screw machine steels given in the American Iron and Steel Institute 1943 List are shown in Table IV. Whether they should be specified with ASTM Grain Size of 1 to 5 or 5 to 8 is a matter of choice.

Austenitic grain size is not as important as it is in the carburizing grades. The austenitic grain size test

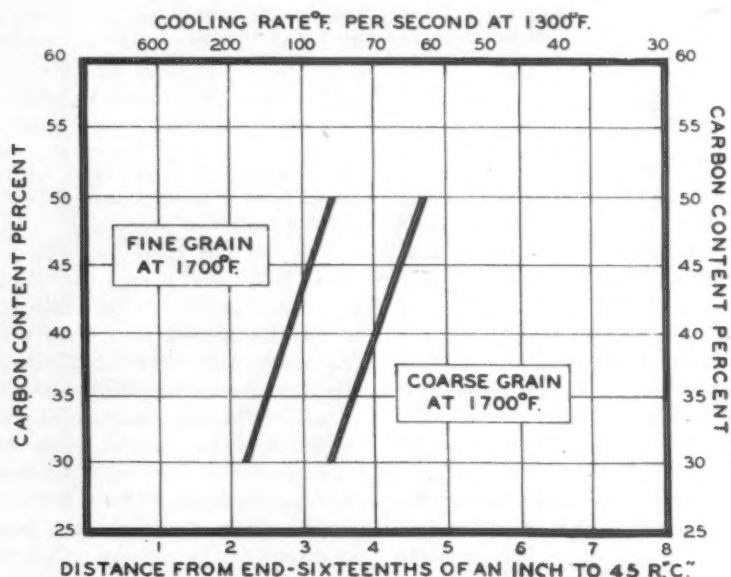
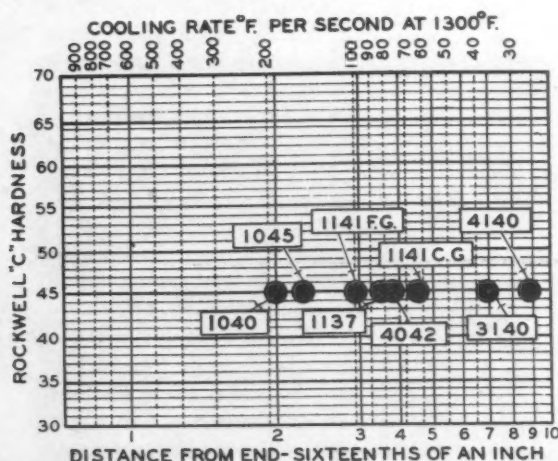


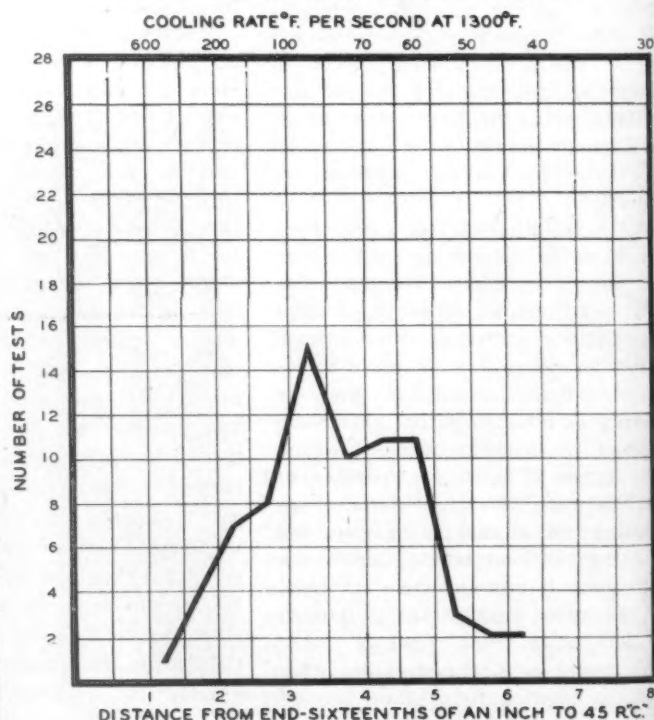
FIG. 17—Effect of carbon content and grain size on the hardenability of medium carbon screw machine steels containing Mn 1.30 to 1.57, S 0.08 to 0.14, Si 0.02 to 0.26, normalized at 1650 deg. F., end quenched in water from 1550 deg. F.

FIG. 18—Comparative hardenability of medium carbon, sulphurized carbon, carbon and alloy steels. End quench tests, based on J-45 value.



CHEMICAL COMPOSITION						AUSTENITIC GRAIN SIZE	QUENCHING TEMPERATURE	NO. OF HEATS TESTED
	C	MN	NI	CR	MO			
A-1040	.41	.76				5-8	1550°F.	26
C-1045	.48	.83				5-8		42
C-1137	.36	1.41				1-4		70
C-1141	.41	1.50				1-4		10
C-1141	.43	1.44				5-8		26
A-3140	.40	.71	1.28	.63		5-8		8
A-4042	.44	.83			.23	5-8		7
A-4140	.42	.74		.99	.23	5-8		13

FIG. 19—Frequency distribution curve for 70 heats of AISI C 1137 steel, normalized at 1650 deg. F., end quenched in water from 1550 deg.; austenitic grain size at 1700 deg. F., coarse; analysis, Mn 1.26 to 1.57, S 0.076 to 0.140, Si. 0.02 to 0.26.



S as Alloy Steel Substitutes

By A. S. JAMESON
Works Metallurgist, International
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made by carburizing a specimen at 1700 deg. F. for 8 hr. and slowly cooling is a very satisfactory test if the grain size happens to be fine (5 to 8), but if the test shows a coarse grain (1 to 5) this merely signifies that the probability is high that the steel will have a coarser grain size than a steel showing fine grain at 1700 deg. F. when heat treated, say, at 1550 deg. F. It is possible that a steel may be coarse grained at 1700 deg. F. but fine grained at 1550 deg. F. very possibly as fine as a steel having a fine grain at 1700 deg. F.

The effect of grain size on the tensile and impact properties is discussed later.

Grain size has an effect on the hardenability. Fine grained steels have lower hardenability than coarse grained steels. Fine grained steels are undesirable for screw machine work if the fine grain size has been obtained by aluminum additions, because of the abrasive effect of aluminum oxide inclusions on the cutting tools.

On the other hand there is a more definite guarantee that coarse structures will not be developed in heat treating operations by specifying a fine grain size.

The effect of grain size on the hardenability as well as the effect of the carbon content is illustrated in Fig. 17. The comparative hardenability of the screw machine steels and plain carbon and alloy steel is

... Medium carbon screw machine steels, their heat treatment and their hardenability in comparison with that of alloy steels is here discussed in the second section of a two-part article. Last week carburizing grades of screw machine steels were discussed from the same viewpoint.

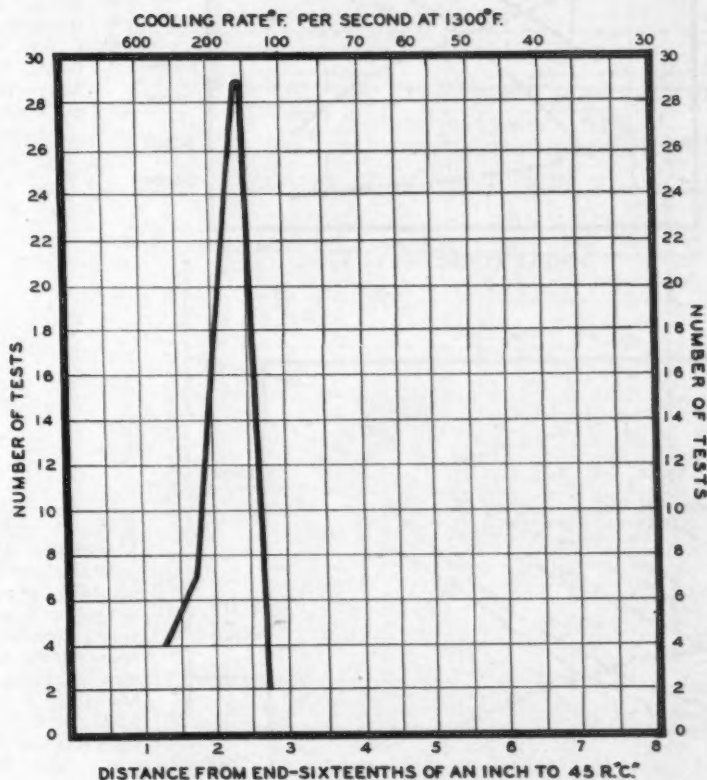


FIG. 20—Frequency distribution curve for 42 heats of AISI C 1045 fine grained steel, normalized at 1650 deg. F., heated to 1550 deg. F., held at heat for 35 min. and end quenched in water; analysis: C, 0.45 min., 0.50 max., 0.48 average; Mn, 0.72 min., 0.90 max., 0.83 average; Si, 0.19 min., 0.29 max., 0.22 average; Cr, 0.00 min., 0.10 max., 0.05 average.

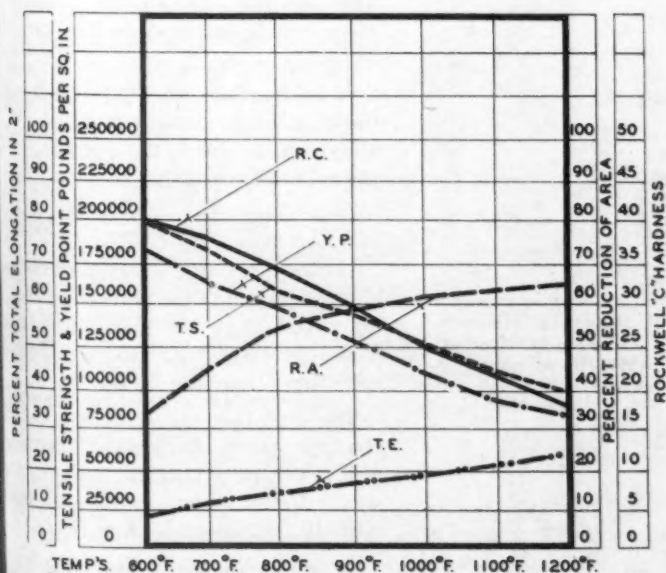


FIG. 21—Tensile properties of AISI C 1137 steel, held 40 min. at 1550 deg. F. and quenched in oil, tempered at indicated temperatures; standard 1/2-in. round tensile test specimen. Analysis: C 0.23, Mn 1.28, S 0.111, Si 0.17; austenitic grain size 3 at 1700 deg. F.

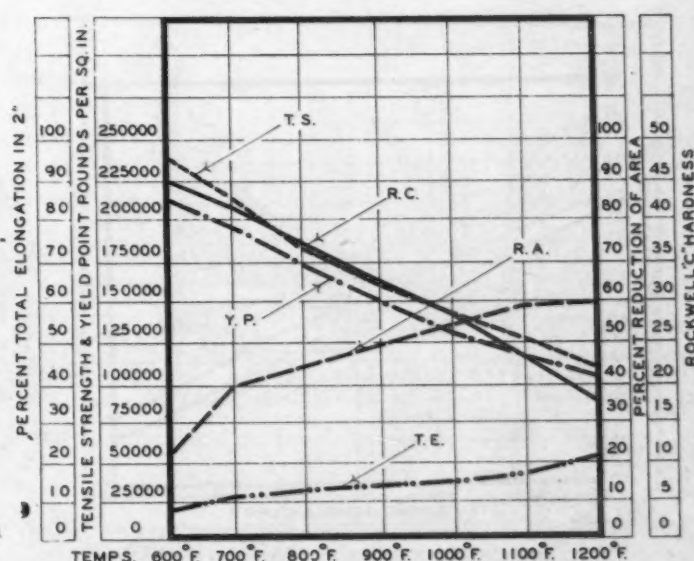


FIG. 22—Tensile properties of AISI C 1141 steel, held 40 min. at 1550 deg. F. and quenched in oil, tempered at indicated temperatures; standard 1/2-in. round tensile test specimen. Analysis: C 0.46, Mn 1.53, S 0.116, P 0.025, Si 0.21; austenitic grain size 6 at 1700 deg. F.

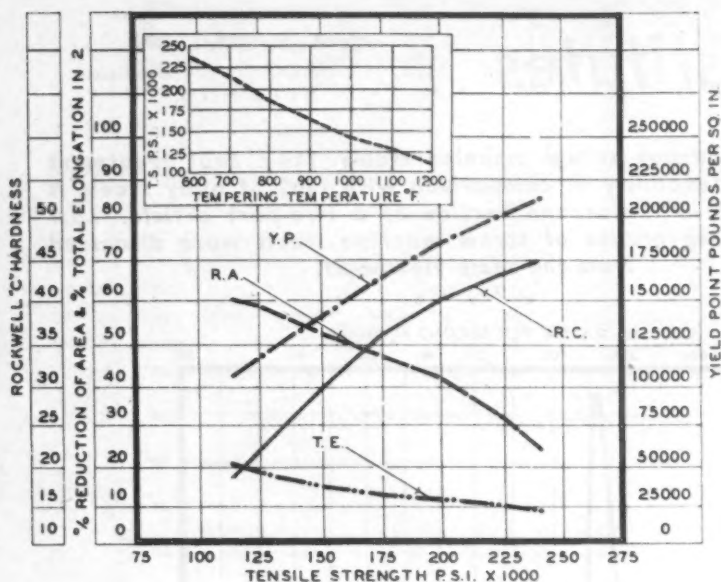


FIG. 23 — Tensile properties of AISI C 1141 steel, held 40 min. at 1550 deg. F. and quenched in oil, tempered; standard 1/2-in. round tensile test specimen. Analysis, C 0.46, Mn 1.53, S 0.016, P 0.025, Si 0.21; austenitic grain size 6 at 1700 deg. F.

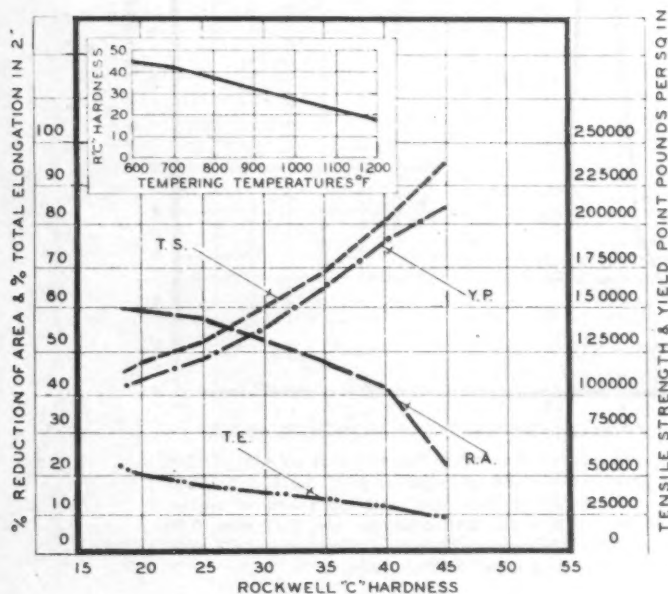


FIG. 24 — Tensile properties of AISI C 1141 steel, held 40 min. at 1550 deg. F. and quenched in oil, tempered; standard 1/2-in. round tensile test specimen. Analysis, C 0.46, Mn 1.53, S 0.016, P 0.025, Si 0.21; austenitic grain size 6 at 1700 deg. F.

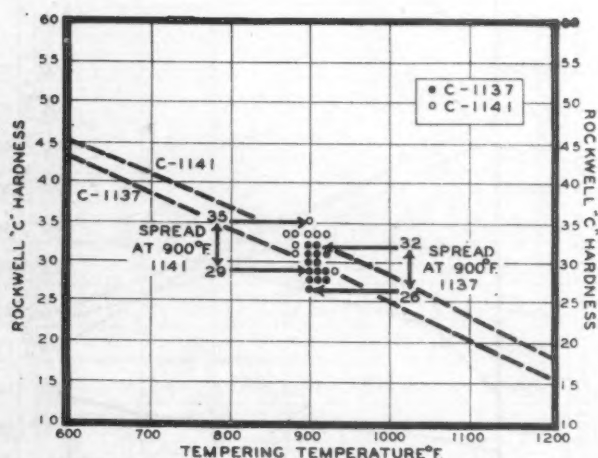


FIG. 25—The relationship of tempering temperature to hardness, Rockwell C. ASTM 1/2-in. test bars, oil quench and tempered, used.

		C	MN	S	Si	AGS AT 1700°F	NO. OF HEATS
C-1137	CURVE DERIVED FROM ANALYSIS	33-128	111	17	3	COARSE	14
C-1141	"	46-153	116	21	6	FINE	9

		C	MN	AGS AT 1700°F	NO. OF HEATS
C-1137	SPREAD DERIVED FROM ANALYSIS RANGE	35-38	139-155	COARSE	14
C-1141	"	44-48	139-154	FINE	9

shown in Figure 18. Translating the data in Fig. 18 into terms of bar sizes, gives the data shown in Table V.

It has been found from plotting a frequent distribution curve from 70 heats of AISI C1137 steel, that the variation in hardenability is greater than for a plain carbon AISI C1045 steel. This is illustrated by comparing Fig. 19 with Fig. 20, and can perhaps be accounted for by stating that most screw machine steels are not made according to special requirement quality practice, which means less control is exercised in the steel mill practice. This in turn is most likely due to the lack of the customer demand for a screw machine steel with uniform heat treatment performance.

Tensile Properties

The tensile properties obtainable from fully hardened and tempered AISI C1137 and AISI C1141 steels are shown in Figs. 21 and 22. The term "fully hardened" means here that the section as hardened had a hardness of over 45 Rockwell C from outside to center before tempering.

In Figs. 21 and 22 the physical properties are shown in the conventional manner. The mode of showing the physical properties is not, from the engineer's view point, the most desirable. It would be more desirable to base the graphs on the hardness or tensile strength as shown in Figs. 23 and 24.

Tempering Effects

In using these tensile charts, it must also be considered that they are not strictly true for all heats of steel. The variation of one point on the previous graphs is shown in Figs. 25 and 26.

A comparison of AISI C1137, AISI C1141, a plain carbon C1050 and two alloy steels NE8442 and 9440, is shown in Figure 27.

It is noted that despite the higher carbon content of C1050 (0.51), the C1141 steel shows a greater resistance to softening by tempering. The alloy steels NE8442 and NE9440 would be expected, show a greater resistance than the C1141.

The relationship of the tensile strength to the Rockwell C hardness of C1137 and C1141, a plain carbon steel, C1050, and an alloy steel NE9440, is shown in Figure 28.

As all medium carbon steel fully hardened (45 Rockwell C from center to outside on the as-quenched condition) and tempered have the same

relationship within the errors of test, there is nothing of significance to mention here.

The relationship of the tensile strength to the reduction of area values, which is a yardstick of the resistance to impact, is shown in Figure 29.

In what is designated as the lower hardness range the sulphurized steels have satisfactory values. In what is designated as the upper hardness range, 30 to 40 Rockwell C, the sulphurized carbon steels, while not having as high values as the alloy steels, are probably also satisfactory. However, in the hardness range above 40 Rockwell C, these screw machine steels have definitely low values and designers should take this into consideration when their use above this hardness is contemplated.

Grain Size

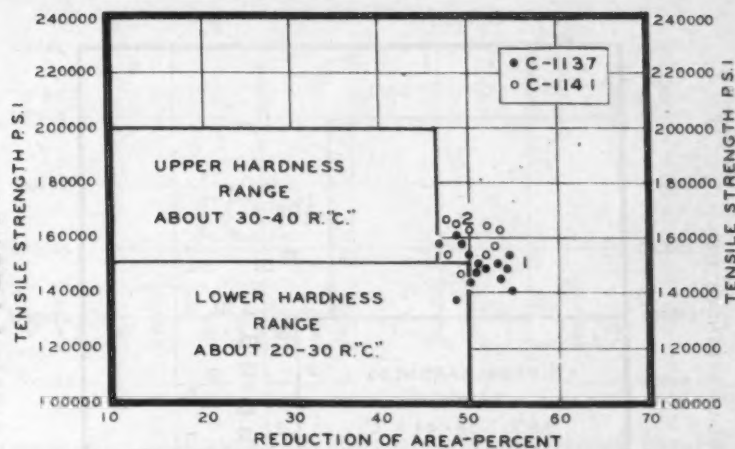
It was stated earlier that grain size was not as important a consideration for medium carbon steels as it was in the low carbon grades. This statement should be modified to this extent, that the lower impact values of steel treated to produce a coarse grain size do not play such an important role at lower hardness values. Carburized steels are used at high hardness levels, 55 to 65 Rockwell, whereas, medium carbon steels are used at lower hardness levels 20 to 40 Rockwell C. Should medium carbon steels be heat treated to hardness levels between 40 to 50 Rockwell C, grain size or the lower impact values obtained from coarse grained structures would become important.

Quenching and Impact

Some impact values for AISI C1137 steel, quenched from 1500 deg. to 1700 deg. F. and tempered at 500 deg. F. to a hardness of 40 to 45 Rockwell C, are given in Figure 30. The effect of the increasing quenching temperature is to produce an increase in the grain size and, therefore, lower impact values.

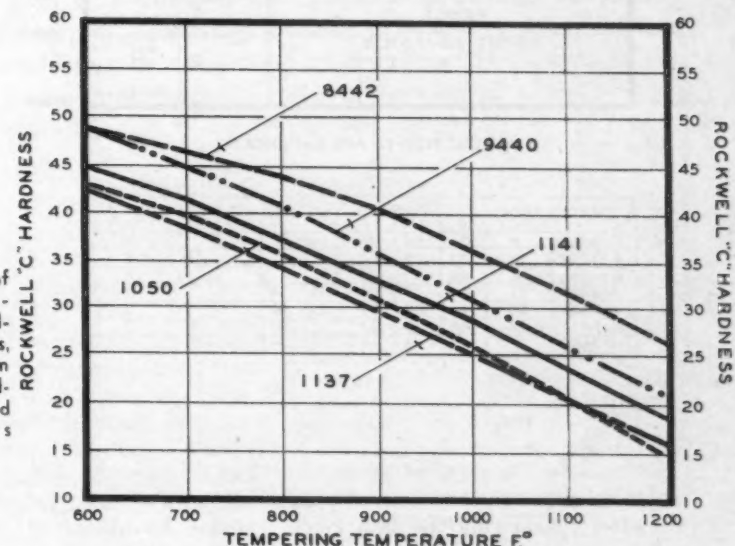
Tensile values for AISI C1137 steel quenched from 1500 to 1700 deg. F. and tempered at 900 deg. F. for a hardness of 25 to 30 Rockwell C are given in Table VI. The "P" value was taken from a report of an investigation on intensifying of NE9440 steel, by the Vanadium Corp. of America (THE IRON AGE, July 1, 1943). It appears that the writer of this article on NE9440 steel considers a difference of about 3 per cent in the "P" value to be significant. It will be noted that the fine grained steel has a higher "P" value.

FIG. 26—The relationship of tensile strength to reduction of area. ASTM 1/2-in. test bars, oil quenched and tempered at 900 deg. F., used.



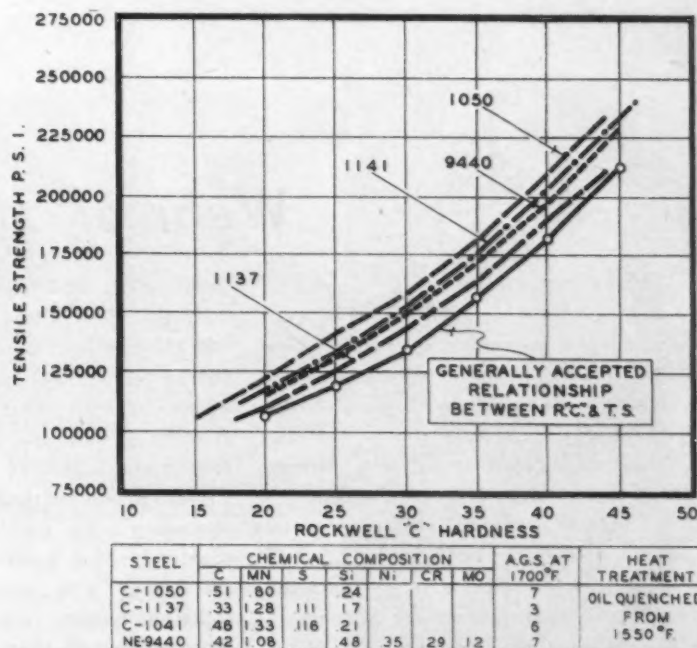
		C	MN	AGS AT 1700°F	NO. OF HEATS
C-1137	SPREAD DERIVED FROM ANALYSIS RANGE	35-38	1.39-1.55	COARSE	14
C-1141	"	44-48	1.39-1.54	FINE	9

FIG. 27—Effect of tempering temperature on hardness of five steels, oil quenched from 1550 deg. F. standard 1/2-in. round ASTM test bars used.

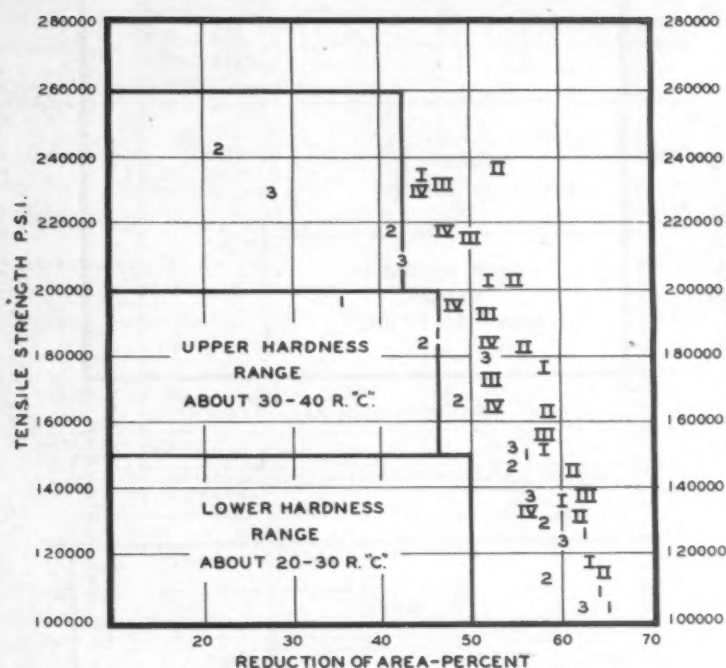


STEEL	CHEMICAL COMPOSITION							AGS AT 1700°F
	C	MN	S	Si	Ni	CR	MO	
C-1050	.51	.80	.24	.17				7
C-1137	.33	1.28	.11	.17				3
C-1141	.46	1.53	.16	.21				6
NE-8442	.45	1.38	.27		.04	.34		7
NE-9440	.42	1.08	.48	.35	.29	.12		7

FIG. 28—Relationship of tensile strength to Rockwell C hardness. Standard 1/2-in. round ASTM test bars used.



STEEL	CHEMICAL COMPOSITION							AGS AT 1700°F	HEAT TREATMENT
	C	MN	S	Si	Ni	CR	MO		
C-1050	.51	.80	.24	.17				7	OIL QUENCHED FROM 1550°F
C-1137	.33	1.28	.11	.17				3	
C-1041	.46	1.33	.16	.21				6	
NE-9440	.42	1.08	.48	.35	.29	.12		7	



STEEL	CODE	CHEMICAL COMPOSITION								A.G.S. AT 1700°F.
		C	MN	Si	Ni	CR	MO	S		
C-1050	3	.51	.80	.24						6
C-1137	I	.33	1.28	.17				.111		3
C-1141	2	.46	1.53	.21				.116		6
A-2340	II	.43	.70	.24	3.26	.08				6
A-3140	III	.41	.64	.19	1.27	.60				3
NE-8442	IV	.45	1.38	.27		.04	.34			7
NE-9440	I	.42	1.08	.48	.35	.29	.12			7

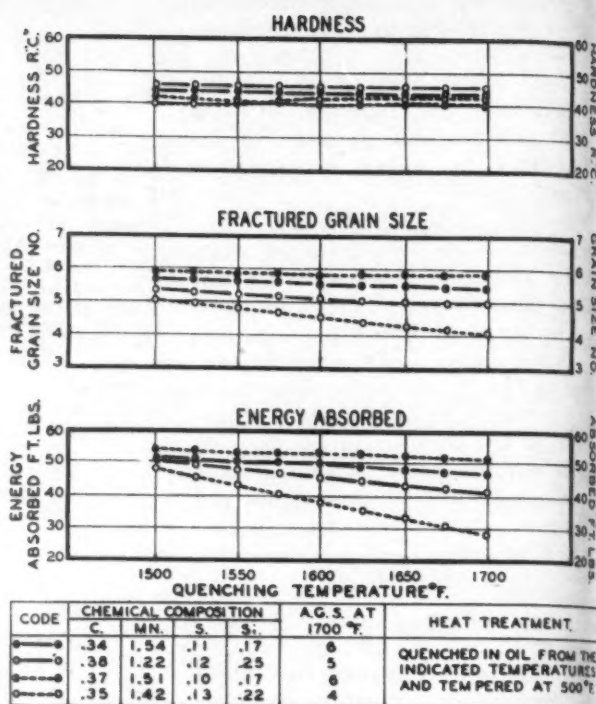


FIG. 29—Relationship of tensile strength to reduction of area of seven steels oil quenched from 1550 deg. F. Standard 1/2-in. round ASTM test bars used. Area to the right of the vertical lines on the chart indicates satisfactory reduction of area values.

FIG. 30—Effect of quenching temperature on the impact properties of AISI C 1137 steel.

It is believed that the user of steel can, after considering the data given in this article, come to his own conclusion as to whether the screw machine steels can be applied as substitutes for alloy steel. It seems to the author that there are definite possi-

bilities for substitution based on intimate knowledge of the application of a particular part under consideration. The result of such a substitution would be to conserve scarce alloys for more essential use and reduce the cost by the lower initial cost of the

steel and by increased production due to increased machinability.

There seems to be some need for the manufacture of a more uniform grade of both low and medium carbon screw machine steel for heat treating purposes.

Wear of Steel Balls

AN investigation, lasting 15 months, of the wear of steel balls in a cylindrical ball mill used for grinding ores in the Transvaal gold mining industry is described by T. K. Prentice in the *South African Journal of the Chemical, Metallurgical and Mining Society*, for January and February.

The mill used for the tests was 30 in. in diameter and 17 in. long. Sets of balls 3 in. and 2 1/2 in. in diameter were run continuously for periods of 5 days 13 1/2 hr. each, the mill being

revolved at 30.5 r.p.m., after which the reduction in volume of the balls was determined; from this the number of days taken to reduce the diameter to 1 in. was calculated. The steel balls with the longest life were forged and contained: C 0.90, Mn 0.89, Cr 0.8 to 1.0, with Si, S and P not exceeding 0.22, 0.035 and 0.025, respectively; the hardness was 350 to 400 Brinell. The tests showed that the rolled balls with the best durability contained in all cases C 0.60 to 0.90,

Cr 0.85 to 2.1, or about 2.5 of manganese.

The tests disclosed that while wearing down from 3 in. or 2 1/2 in. to 1 1/4 in. in diameter, the loss of weight was directly proportional to the square of the diameter and therefore to the surface area of the ball; the subsequent wear from 1 1/4 in. downwards was relatively slower and more in accord with E. W. Davis' theory that the loss in weight is directly proportional to the cube of the diameter.

Centralized Grinding for Single-Point Tools

WITH the influx of new workers, particularly women workers, into the shop, it is becoming more essential than ever to centralize the regrinding of single-point cutting tools in one maintenance area rather than leaving the grinding of tools up to each individual lathe, planer or shaper operator. In a central area, all the needed equipment can be concentrated and the personnel can be trained to carry on the work on a modified mass production basis by dividing it up among specialists. Some will rough grind high speed steel tools, others finish them and still others handle the grinding of carbides. Tipping can be a separate function.

One of the latest and best examples of such a centralized grinding room for maintenance of single-point tools is found in the machine shop of the Puget Sound Navy Yard, Bremerton, Wash. This room is placed directly above the tool issuing room where the bulk of lathe and planer tools are issued. A dumwaiter will serve as a means of transportation between the single-point grinding room and the tool issuing room. The floor space of 20 ft. wide by 80 ft.

... Effective control of tool shapes is possible only by taking the grinding of tools out of the hands of operators and using machine setups in a central grinding room. Mr. Ainsworth describes the facilities and plan of tool control at Puget Sound Navy Yard. The opinions or assertions contained in this article are those of the author and should not be construed as reflecting the views of the Navy Department or of the Naval Service at large.

By **WALTER E. AINSWORTH**

*Foreman, Tool Maker,
Puget Sound Navy Yard*

long is considered ample for the maintenance of all types of single-point cutting tools used at this yard. The modern grinding equipment which is installed makes it possible to duplicate any tool desired. Sketches and templates are available for the majority of standard tools.

In this tool room, Fig. 1, the following machines are found:

3—Sellers "tub" grinders for roughing out high speed steel tools

1—Bura-way grinder for finishing convex form tools with constant relief in the direction of feed

1—24x24 in., 10 hp. "Standard" floor

stand grinder for roughing out shank materials on carbide tipped tools

1—Hammond double-end grinder with protractor tables for touching up high speed steel bits

1—Clark single silicon carbide wheel grinder for roughing out carbide tips

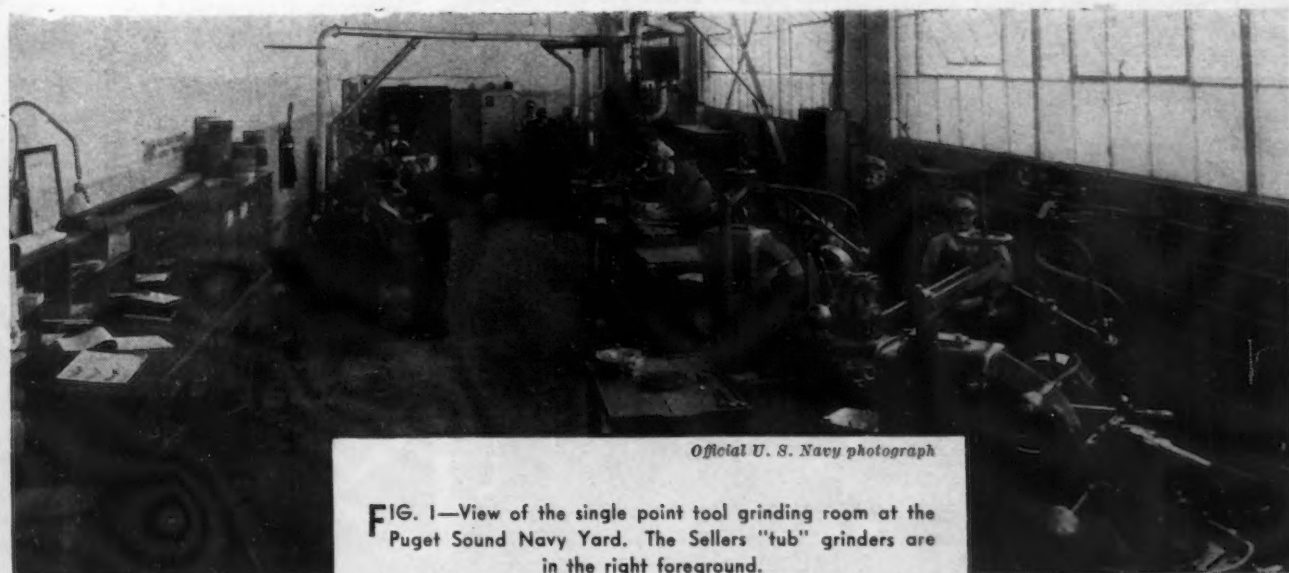
1—6-in. Ex-Cell-O carbide grinder with diamond impregnated wheel

1—10-in. double wheel Ex-Cell-O carbide grinder

2—Sundstrand 3-wheel carbide grinders, combining silicon carbide and diamond impregnated wheels.

1—Lee carbide chip breaker groove grinder

Except for the Sellers tub grinders, which are inherently wet ma-



Official U. S. Navy photograph

FIG. 1—View of the single point tool grinding room at the Puget Sound Navy Yard. The Sellers "tub" grinders are in the right foreground.

chines, all grinding is done dry and there is a central exhaust system to which most of the grinders are connected by sheet metal ducts.

The ultimate goal which this yard is attempting to reach is to have all single point cutting tools ground by specialists at this central location and be available to mechanics when required. It is desired that dull tools be returned to the toolroom and exchanged for a sharp tool, rather than have the mechanic stop production while he grinds this tool free hand. The various cutting angles, which mean so much to the life of the tools and therefore increasing production, may be controlled to greater accuracy by machine grinding. Another advantage is that these tools may be run through the grinding machines in quantities, where setups will be held to a minimum.

It is impossible for even the most skilled mechanics to grind single-point tools to a uniform point, free hand, unless much time is spent and considerable more material ground from the tool than is necessary. To receive the greatest production from any tool there is only one best set of angles or contour of point. This objective cannot be reached by having hundreds of mechanics grinding tools free hand. The ideal is reached by ascertaining the correct angles and point contour and then making all tools exactly the same by machine grinding, removing the human element as much as possible, as this varies with each different workman and also with each workman's attentiveness to the job.

An educational program is being relied upon to convince older mechanics accustomed to grinding their own tools to forms not necessarily the best that submission of all tools to a central grinding agency for sharpening will insure better results.

Younger operators accept the system without protest. Tools are transported and stored in racks which hold each tool in a position where the cutting edge will not become damaged by contacting other tools or hardened surfaces.

At the present time approximately 40 per cent of the high speed tools and 100 per cent of the carbide single-point tools in the machine shop at this yard are reconditioned at this central grinding room.

About 80 per cent of the single-point cutting tools used in the machine shop are carbides. Most of the applications are for turning cast steel like valve bodies, bar steel, armor plate and bronze. Cast iron is a material rarely encountered. Many single spindle automatics are tooled with carbides except for threading operations, as are many of the turret lathes. On vertical turret lathes, mechanically held "OK" tool bits are frequently employed where high speed steel is the choice.

Much progress has been made in single-point cutting tools in regard to conservation and increased production. Operators in the central toolroom have been carefully trained to grind tools correctly. Standard tools are used as much as possible, and special tools are generally made in sufficient numbers so that dull tools may be exchanged for sharp tools, thereby reducing the down time on machines as much as possible.

Single point tools of special nature are handled by an application man

who analyzes special jobs and prepares a sketch of the desired tool which he delivers to the person in charge of the grinding room, where the tool is made according to the specifications. Upon the completion of the job in the shop, the tools are returned to the grinding room, reconditioned and placed in storage pending the reoccurrence of the job. An accurate record of the performance of special tools is difficult to obtain, due to the quantity of small jobs involved, but a great reduction in tool consumption has been noted.

Tool Tipping Practice

As an adjunct to the central tool crib there is a welding booth where carbide tips are installed and broken tools built up by atomic hydrogen welding. Although not originally purchased for this purpose, the atomic hydrogen torch is working out exceedingly well for tool tipping work. The concentrated heat obtainable results in a fast job and the hydrogen afford a protective atmosphere for the work. Silver brazing alloys are used with a borax flux.

Nearly every tool used in the shop today is a tipped tool, including high-speed steel tips and the cast non-ferrous alloy materials. High speed steel tipping is done in the blacksmith shop. Shanks are sheared from scrap armor plate which is not adversely affected at the high heat for hardening high speed steel, particularly if the shank material is first normalized and then quenched in oil. Cementing with Cinch steel cement is the practice used. After the tip recess is bathed with copper sulphate, the cement is spread on and the tool tip put in place. Setting of the cement and heat treating the tip takes place simultaneously. If the tip is high speed steel, the whole tool is first pre-

Official U. S. Navy photograph

FIG. 2—Welding booth where carbide tips are installed and broken tangs built up with atomic hydrogen welding. The table top is a large cast iron slab mounted on pipe stanchions.



heated to 1500 to 1550 deg. F., then put in the high heat furnace and brought up to the quenching temperature of 2250 deg. Before the tool is quenched in oil, the excess cement is

squeezed out in a foot-operated press constructed from a revamped wood router head.

This heat treatment not only hardens the tip but gives the shank a

spring temper that leaves it tough and fairly hard (30 Rockwell C). Such tools are excellent for heavy shaft turning and boring where the tool overhang is necessarily high.

Effects of Cold Drawing on

Welded Steel Tubing

THOUGH the effects of cold drawing on welded steel tubing are well known, data giving the effects quantitatively have been lacking. The accompanying set of curves summarizes quantitative data obtained by the University of Illinois' engineering experiment station in a recent study made with SAE 1010 welded steel tubing. If the properties of the normalized SAE 1010 welded steel tubing free from cold working are known or can be determined, the amount of cold drawing required to bring about a given increase in strength or hardness and the concurrent decrease in ductility as measured by percentage elongation may be determined by use of this set of curves.

It was found in this study that the reduction of cross-sectional area of the metal in the tubing lends itself readily as a measure of cold working, for the reason that the reduction of external diameter required (and hence the size of the die needed) to produce a given amount of reduction of area of the metal in a tubing of a certain size may be readily determined if the change in wall thickness that occurs during cold drawing of the tubing is known. The wall thickness of tubing is affected but little by cold drawing, and may with little error be assumed to remain constant during cold drawing. Thus the amount of cold working may be controlled in production with no additional measurements or observations than those normally taken.

The increases in the tensile and compressive yield strengths (0.20 per cent offset) of the SAE 1010 welded steel tubing were of the same order of magnitude for equal amounts of cold drawing up to 50 per cent reduction of area, which was the maximum amount of cold drawing to which the tubing was subjected. This fact is important in the use of tubing for load-resisting members, and is in contrast with the effect of cold stretching, in which the compressive yield strength is increased considerably less than is the tensile yield strength.

Amounts of cold drawing of the SAE 1010 welded steel tubing up to about 10 per cent reduction of area produced relatively large increases in strength and hardness, whereas additional amounts of cold drawing up to at least 50 per cent reduction of area caused these properties to increase, but the increase was relatively less.

For amounts of cold drawing above approximately 10 per cent reduction of area, the relation between the strength of the SAE 1010 welded steel tubing and the amount of cold drawing may be expressed by the general straight line equation, $S = kSa(1 + R)$, where S is either the tensile or the compressive strength and either the ultimate or the yield strength, and S_a is the corresponding strength of the normalized tubing free from cold drawing.

A fairly definite relation existed for the cold-drawn SAE 1010 welded steel tubing between the ultimate tensile strength (which will here be denoted as T since S in the foregoing

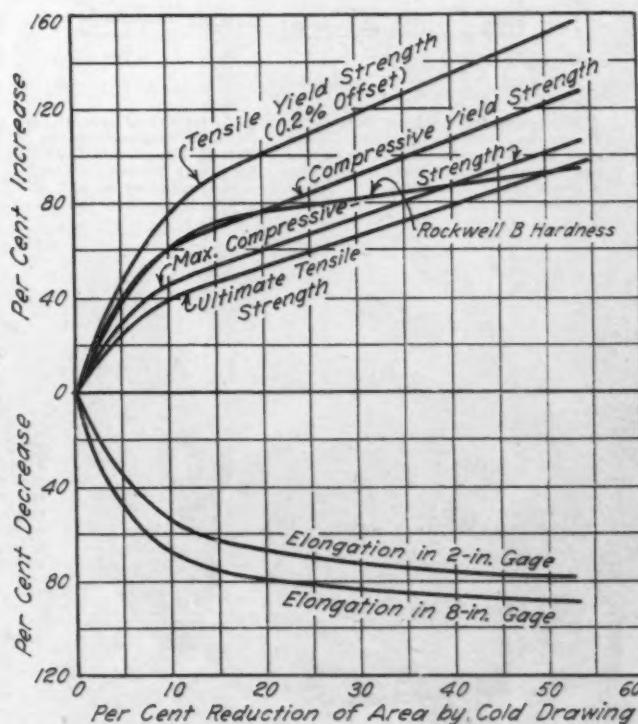
equation has several meanings) and the Rockwell B hardness number

$$(R_n); \text{ namely, } T = \frac{146}{R_n} = R_n$$

The tensile yield strength of the normalized SAE 1010 steel tubing free from cold working was about 0.70 of the ultimate tensile strength; for cold-drawn tubing in which the reduction of area of the metal in the tubing by cold drawing was greater than about 10 per cent, the corresponding ratio was fairly constant at about 0.95.

The ductility of the SAE 1010 steel tubing as measured by the percentage elongation in an 8-in. gage length in the tension test decreases rapidly with the amount of cold drawing up to about 10 per cent reduction in area, and decreases much less rapidly for further amounts of cold drawing. The decrease in ductility is about 70 per cent for 10 per cent of cold drawing, and about 90 per cent for 50 per cent of cold drawing.

CURVES indicating effect of cold drawing on tensile yield strength, compressive yield strength, maximum compressive strength, hardness, ultimate tensile strength, and ductility of SAE 1010 welded steel tubing.



Making Carbide Tipped Flat B

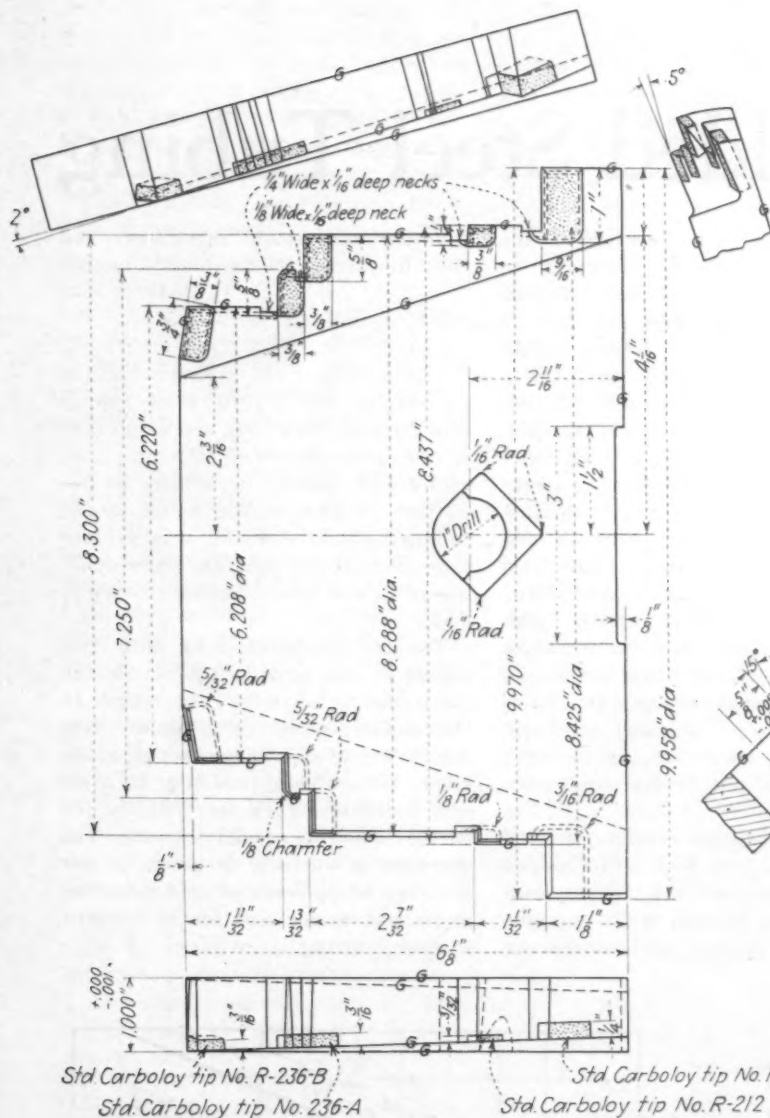
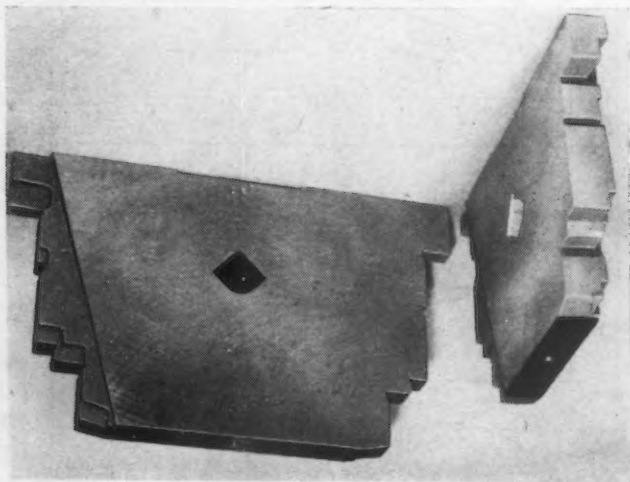


FIG. 1—The front spindle hole form cutter is typical of several sizes and designs used by Warner & Swasey. These tools were originally made of high speed steel but have been converted to SAE 3135 steel tipped with Carbobloy grade 44-A tips, all of standard size as indicated. Note that all five tips on one side lie in a single rake angle plane, thus simplifying rake grinding as well as milling of the recesses. Front and side relief angles are all constant for the same reason.



LEFT
FIG. 2—Cutter blank, with seats milled for the carbide tips. For this operation, the cutter body is supported at the rake angle in a universal vise on the milling machine table.

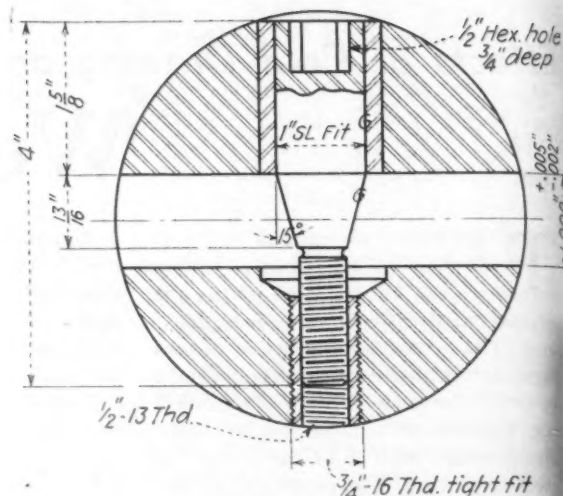


FIG. 3—The odd-shaped hole in the center of the cutter (see Fig. 1) combines a 1-in. hole with two tapers which allow a hardened and ground plug to force the cutter against one side of the slot in the boring bar as shown in the sectional drawing.

BELOW

FIG. 4—After the carbide tips are brazed in place with a gas torch in the conventional manner, the first operation in finishing the cutter is grinding the top rake surfaces. In effect this is simply a surface grinding operation, performed in a universal tool and cutter grinder. The tool is clamped in a universal tilting vise.



Flat Boring Cutters

... Several interesting points in special carbide tipped cutter design and manufacture are exemplified in the flat form cutters used to bore the front and rear spindle holes of turret lathes made by Warner & Swasey Co., Cleveland. The accompanying photographs and drawings illustrate the various steps in the manufacture of such tools, which are used in a horizontal boring machine spindle.



LEFT

FIG. 5—Circle grinding of the body, illustrated, and side relief grinding of the tips are performed on the same grinder shown in Fig. 4, except that the grinding wheel head is rotated 90 deg. and the work is supported on centers with the aid of a special arbor, Fig. 6.

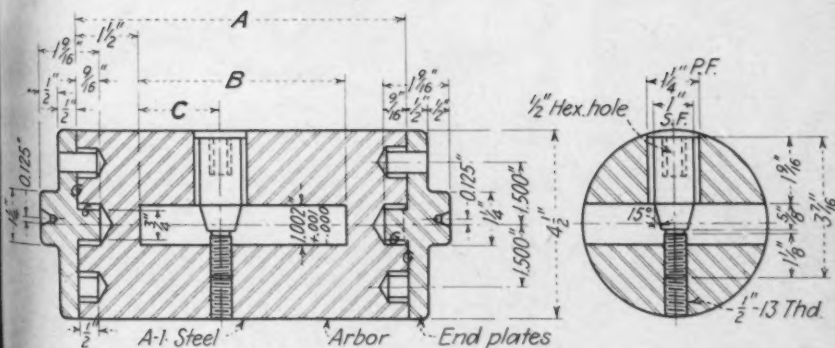


BELOW

FIG. 6—Special arbor used for both center grinding and side relief grinding of carbide tips on flat boring bars. For center grinding, the end plates shown are removed and the arbor is swung on its own centers. For relief grinding of one set of cutting edges, the end plates are mounted as shown. This offsets the cutter body 0.125 in. and provides the desired backoff. For relief grinding the other side, the end plates are rotated 180 deg. Locating pins engaging bushed holes simplify this procedure. Note that the cutter is held in the arbor slot with a tapered plug corresponding to the locking plug used in the boring bar itself (see Fig. 3).

FIG. 7—For grinding the front relief of each step, the use of the tilting vise is resorted to once more. The grinding wheel head is swung around so as to bring the cup wheel into position. Upon completion of relief grinding of one side of the cutter, it is turned over and the other side presented to the grinding position.

FIG. 8—Finished form cutter held in the boring bar ready for work.



	A	B	C	Mark
1/8 Reqd.	8	5	2	342-30-11
1/8 Reqd.	11 1/2	8 1/2	2 1/2	510-1-17C

... Pressure Welding

MAKING a pressure weld is a butt welding process in which the ends of the two members to be joined are pushed together while heat is applied to the joint. To produce consistently satisfactory welds, all steps of the process must be carefully controlled.

At Menasco, pressure welding is being applied to heavy tubing and forgings, such as the composite strut illustrated. Rigid fixtures are provided for holding the two parts to be welded, since rigidity and perfect alinement of the fixtures is essential to produce an accurate weld assembly. Pressure is applied to the joint by means of a hydraulic cylinder and the correct pressure for each weld is con-

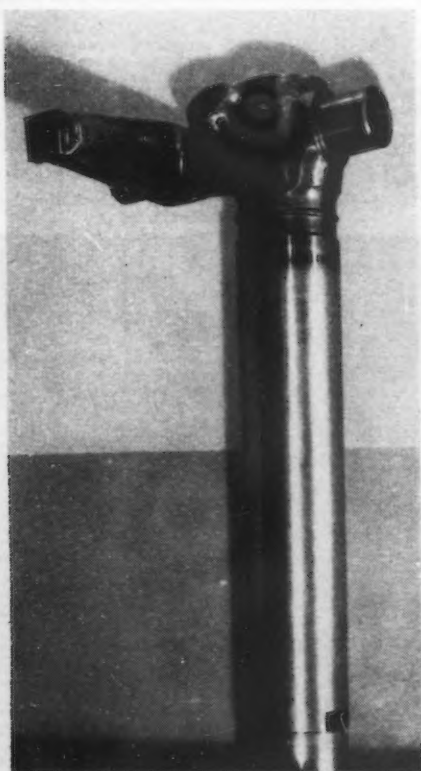
stantly maintained throughout the entire welding cycle. Heat is applied to the joint by means of a large number of oxy-acetylene jets completely encircling the parts and impinging upon the plane of abutment of the two parts. To further distribute the heat around the joint, the heating head is oscillated circumferentially.

As the parts are heated, the metal becomes plastic and the pressure produces an upset or thickening of the metal at the joint, accompanied by a corresponding shortening of the parts. The welding process is controlled principally by this shortening and the magnitude of the pressure applied to the parts. For a given material, the magnitude of the pressure controls the

temperature of the metal during welding, inasmuch as the temperature at which upsetting will occur depends largely upon how much pressure is applied.

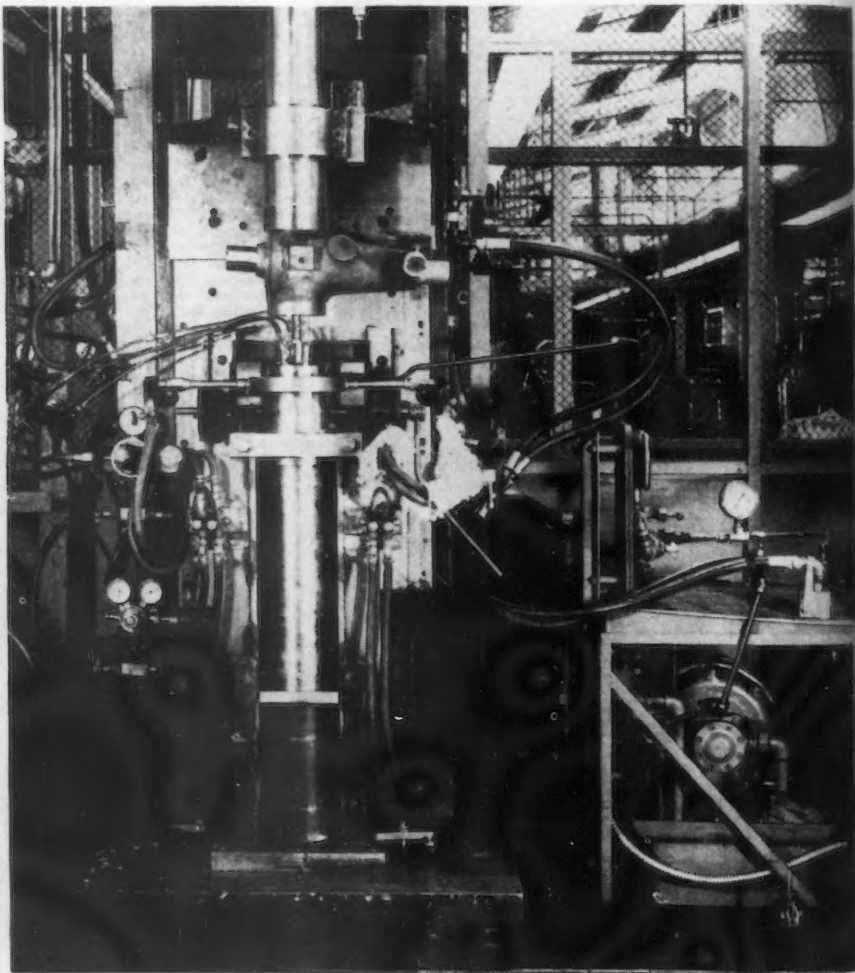
The amount of shortening which will produce sufficient upsetting for a satisfactory weld is determined experimentally. Once this is determined for a particular assembly, any subsequent weld of the same parts is assumed to be completed when the proper shortening of the parts has been accomplished.

The preparation of the parts for welding is extremely important. The faces which butt together must be square and smooth. The inside and outside diameters must be the same



LANDING gear strut for a large cargo plane made by pressure welding tubing, 6 1/8-in. o.d. by 5/16-in. wall, to a forging.

ADAPTATION of a hydraulic press for pressure welding. The tubing is supported in the lower half of the fixture and the forging is held on the ram. The oxy-acetylene jet ring is in the central part of the machine.



g of Heavy Tubing . . .

for both pieces and good contact must be secured over the entire surface. Immediately before joining the parts, the mating surfaces must be thoroughly cleaned, since any oxides or foreign material on these surfaces may produce an inferior weld.

During heating, no oxidation of the mating surfaces occurs because the high pressure maintained throughout the welding cycle excludes all air. On completion of the pre-determined amount of upsetting, the heat is shut off and the pressure relieved simultaneously. The parts are immediately removed from the holding fixtures and the weld allowed to cool.

The external bulge produced by the upsetting (see photomicrographs) is

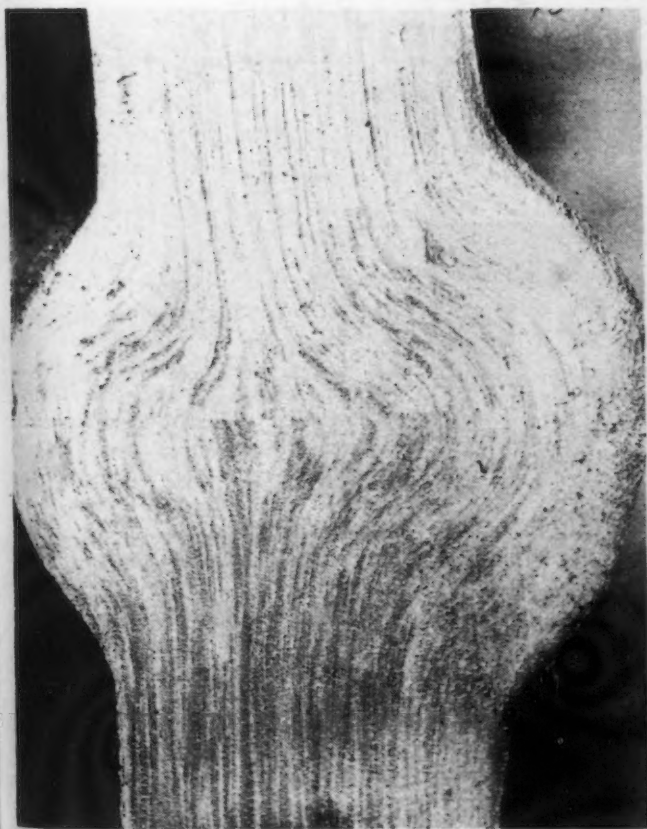
. . . Procedure details are given on a new method of joining tubing to a machined forging in the manufacture of aircraft landing gear struts. Shock struts are ordinarily made from forgings, machined from the solid, with some of the lugs attached by arc welding. (See "Menasco Makes Landing Gear Struts," THE IRON AGE, May 27, 1943.)

By WILBUR G. WOOD

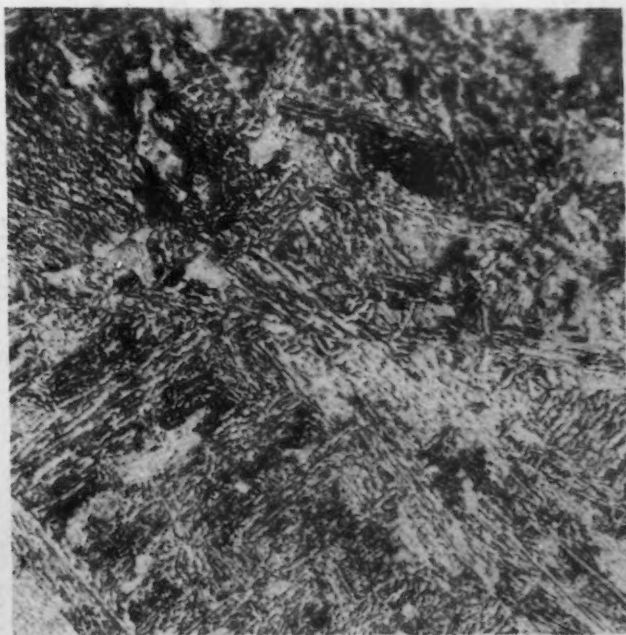
*Chief Engineer, Aircraft Strut Division,
Menasco Mfg. Co., Burbank, Cal.*

removed by machining and in some cases, the internal bulge is also removed. It is necessary to remove the external bulge because the surface

material has been damaged to some extent by the intense heat of the flames. The removal of the internal bulge reduces stress concentrations



PHOTOMACROGRAPHS (7 1/2 x) of an experimental pressure weld of SAE 4135 tubing of 1 5/8 o.d. and 5/16-in. wall thickness. The assembly has been normalized after welding.



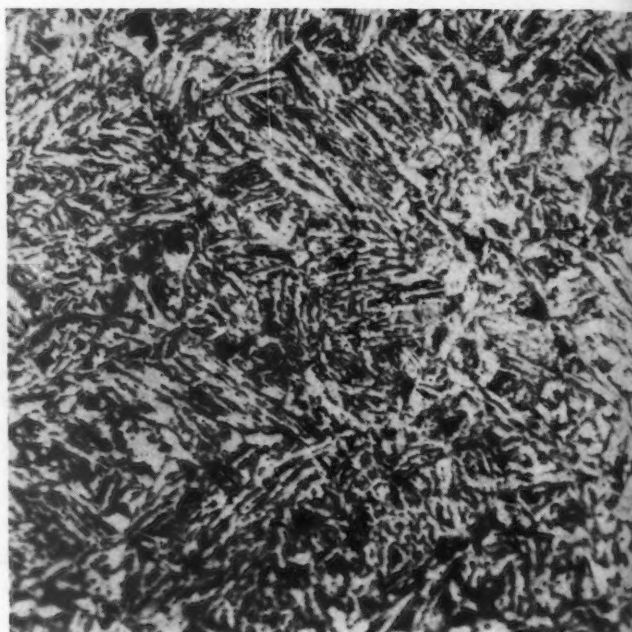
PHOTOMICROGRAPH (500 x) of a pressure weld in SAE 4135 tubing of 1 5/8 in. o.d. and 5/16-in. wall thickness. The plane of the weld is horizontal, in the midsection of the photograph. Microstructure is as welded.

which occur where there is a change in section.

The weld is greatly improved by subsequent heat treatment, consisting of normalizing, quenching at the critical temperature and drawing to obtain desired physical properties. Compare the photomicrograph of the joint as welded and after normalizing.

An investigation is being conducted to determine an inspection process for the weld joint. To date neither magnetic inspection nor X-ray examination has given reliable results. Until such time as a reliable inspection method has been developed, all welding joints will be proof loaded. The proof load will be of such magnitude as to produce a stress in the plane of the weld equal to 50 per cent of the ultimate stress which may be expected of the parent metal.

o o o
MICROSTRUCTURE, after normalizing, of a pressure weld in SAE 4135 tubing, 1½ in. o.d. x 5/16-in. wall thickness. (500x). Plane of weld is horizontal, in the midsection of the photograph.
 o o o



Induction Heater . . . Speeds Tube Forming . . .

By WILSON SCOTT

*Transformer Engineer, Westinghouse
 Electric & Mfg. Co., Sharon, Pa.*

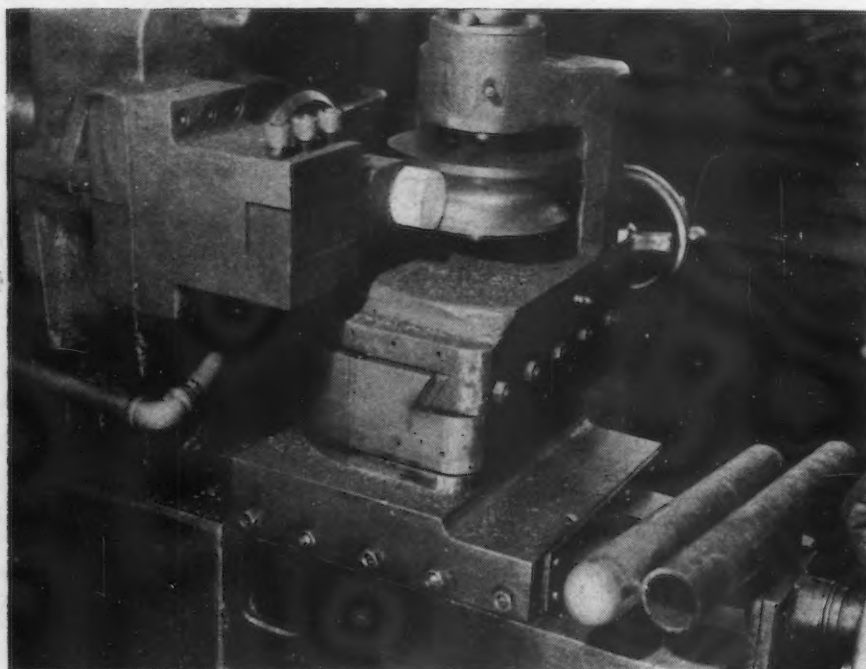


FIG. 1—Preheated tube at beginning of the spinning operation. Note the cold and the closed tubes on table of machine.

IN order to cool the oil in a transformer, vertical tubes are placed on the outside of the transformer case. These tubes take advantage of natural convection currents and cool the oil by circulation in sections exposed to the air. The transformer heating that requires such elaborate means of dissipation is caused in part by eddy currents set up in the iron core. In the actual construction of a transformer, this same effect is utilized to heat the tubes that form the coolers.

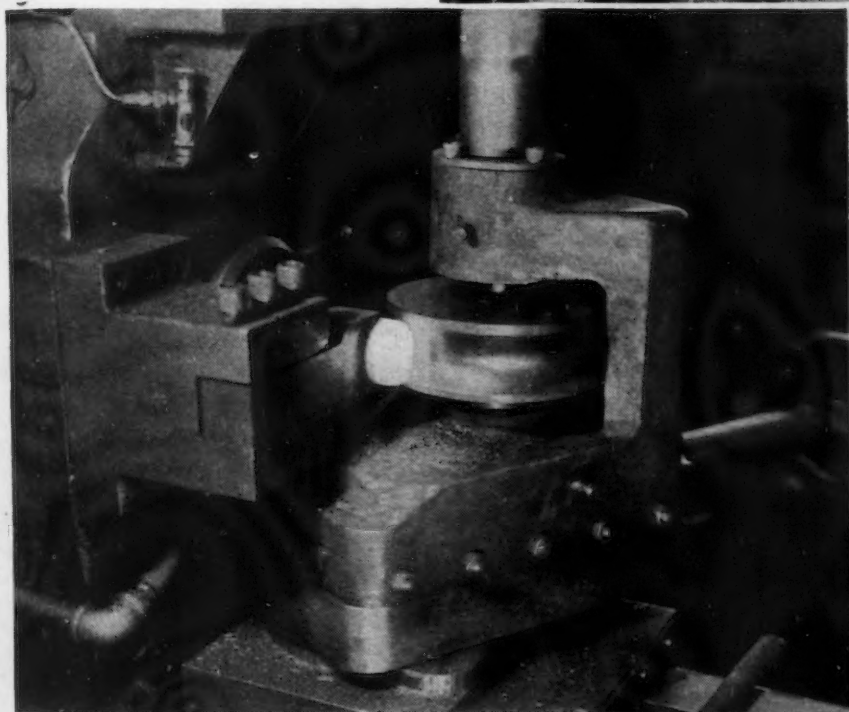
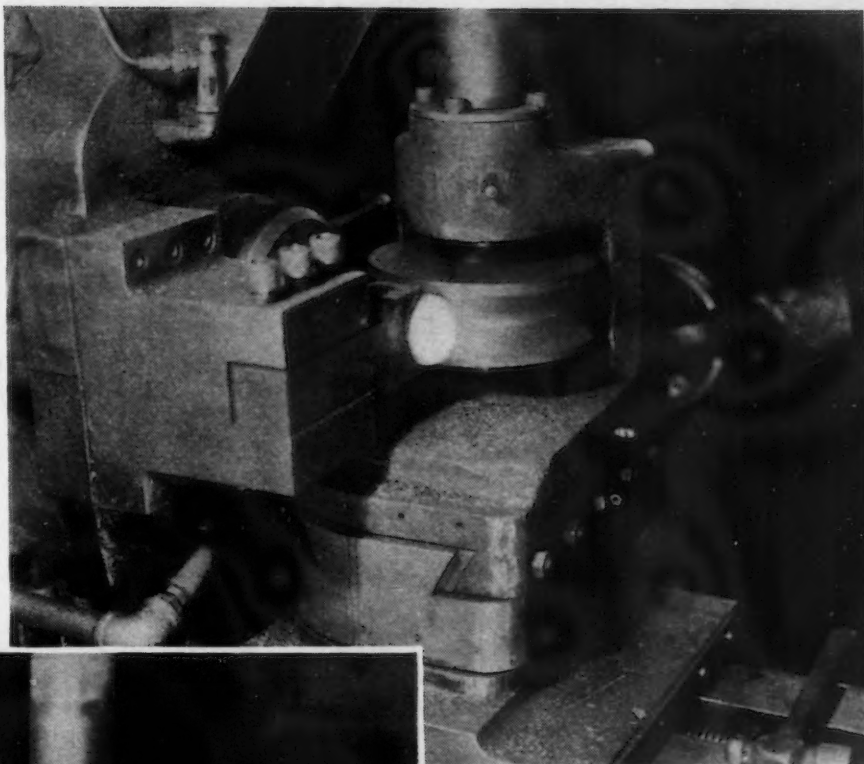
The end of the tube to be formed is placed inside a conductor through which current flows; thus the tube is heated to a temperature of 1560 deg. F. in 50 sec. Figs. 1, 2 and 3 illustrate the various steps in forming the end of the tube to effect an oil tight seal; at the same time a product is obtained that readily lends itself to modern streamline designs. The operation is typical of hot-spinning operations. The tube to be formed is rotated rapidly on a horizontal axis

and is worked into the desired shape by a steel die, or roll that is rotated about a vertical axis. The roll is mounted in line with the tube and is adjustable so constant contact with the tube can be maintained. Past practice utilized friction between tube and roll to develop the heat required to weld the final closure. This was very severe on the equipment due to variation of temperature and strain on the parts.

In order to speed up the spinning operation and increase the life of the spinning roll, a high frequency induction heater has been installed. The end of the tube is preheated to a cherry red heat, spun against the roll,

RIGHT

FIG. 3—Spinning operation is practically finished; the end is completely closed.



ABOVE

FIG. 2—Tube partially formed; the end is not completely closed.

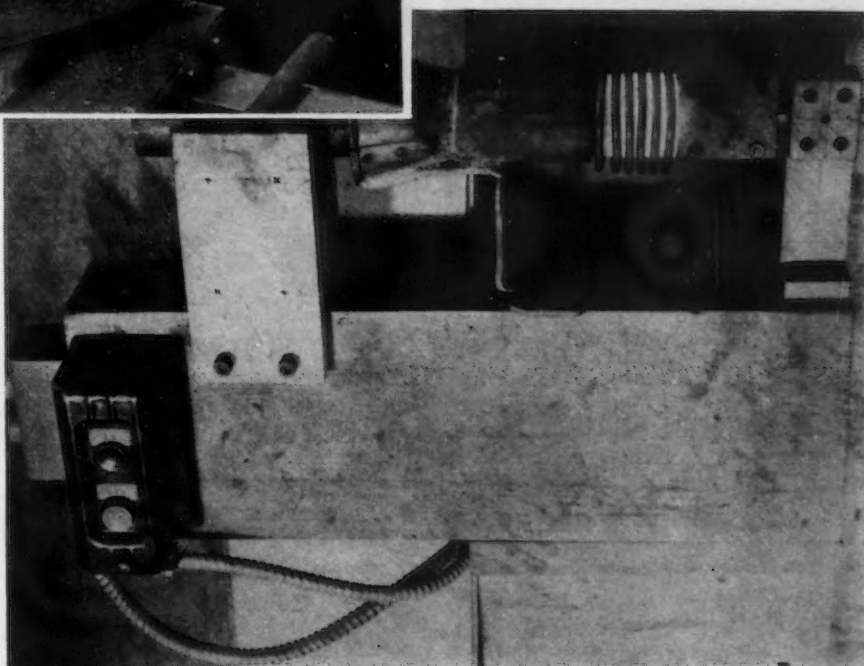
and the end closed as before. This additional heat allows the operation to be completed in one-half the previous time, and approximately ten times the life is obtained from the spinning roll. In addition, since the material is softer when hot, there is less wear on the entire machine. The location of the heater is such that the operator makes a minimum of movements. Fig. 4 shows a close-up view of the tube in the coil.

The heater itself requires very little attention from the operator; he presses an operating button and

places the tube into a fixture. Thus one tube is heated while the operator is spinning another. The entire heating operation for a 2 in. standard pipe takes place in 55 to 60 sec. The pipe is heated to about 1472 deg. F. for a distance of approximately 2½ in. Oxidation is kept to a minimum because of the short time involved.

BELOW

FIG. 4—Assembly of push button, tube holder and copper coil. The tube in position has been heated to about 1470 deg. F.

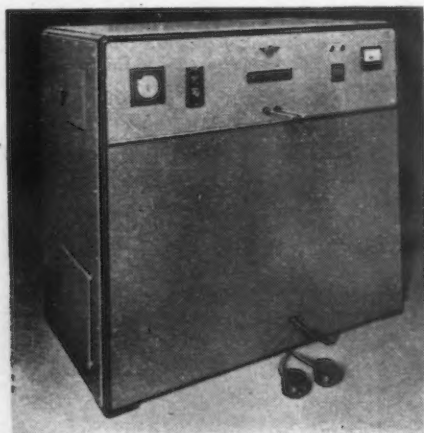


New Equipment . . .

Heat Treating and Process Control

Recent developments in heat treating furnaces, timers and accessories are described herein.

TWO new induction heating units in sizes of 16 and 32 kw. for surface hardening, brazing, soldering and other heating applications requiring localized heat have been built by *Van Norman Machine Tool Co.*, Springfield, Mass. In operation, the proper heating coil for a particular job is connected, the heat and quench cycle required is set, and in a few seconds piece after piece will be hardened, brazed, soldered, etc., it is claimed. To change from one job to another, the work-holding fixture and heating coil are changed and the heating cycle reset to meet the new requirements. The entire heating operation is automatic. The oscillatory circuit is set up through a series of enclosed spark gaps, the circuit constants being determined by selecting proper capacitance and inductance.



Induction Heating Machine

THE highly flexible 15-kw. output Tocco Junior induction heating machine, announced by the *Ohio Crankshaft Co.*, 3800 Harvard Avenue, Cleveland 1, is a small compact 9600 cycle high-frequency unit. A 20-hp. motor-generator set insures a dependable source of power. It is said to be especially adapted for the brazing of small parts such as carbide tips, tube fittings, shell adapters, burster

tubes and many other items. Carbide tips of more than one size can be brazed before a change in inductors is necessary. Coils are shock resistant and water cooled. Machines are available with one or two working stations. The unit is furnished with pre-set automatic controls, quenching auxiliaries, transformers, capa-

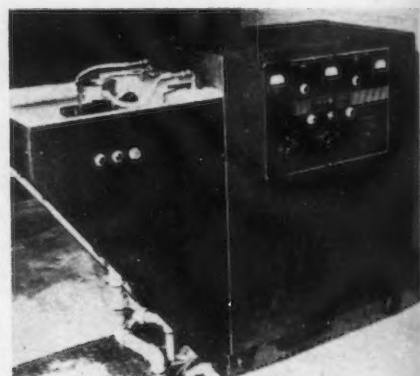


citators, foolproof meters and push-button starting and stopping. Timers are placed on the front panel beneath the work pan, and filters are set behind the ventilating louvres to protect the motor compartment from grime and dust.

Electronic Heaters

A LINE of electronic heaters for high-frequency induction heating of metal parts for brazing, soldering and selective heat treating has been announced by the *General Electric Co.*, Schenectary. Essentially power oscillators which convert 60-cycle power to high-frequency power at approximately 500,000 cycles, the electronic heaters are available in two standard sizes, one having an output of 5 and the other 15 kw. The a.c.

line voltage is stepped up by a power transformer and rectified to supply the oscillator circuit, which consists of grid-controlled vacuum tubes shunted across a parallel resonant circuit. The tube functions like a rapidly operating switch at the fundamental frequency of the resonant circuit. The heater coil is connected in series with the parallel resonant inductance by means of connectors, taps being provided to give flexibility in obtaining maximum efficiency for various heater

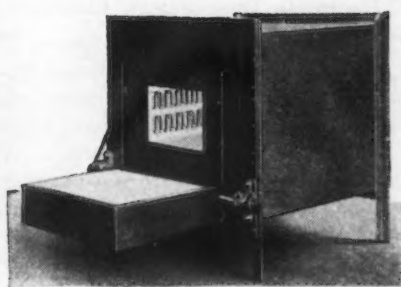


coils. A timer in the oscillator permits the automatic timing of heating cycles.

Tool Room Furnace

THE MLR-4 bench type furnace has been built by *Harold E. Trent Co.*, Leverington Avenue & Wilde Street, Manayunk, Philadelphia, and is similar to the large type H box furnace. The heating elements are the Trent "Folded and Formed" nickel chromium ribbon units. The outer casing is made of steel reinforced and lined with different layers of insulation. The welded steel lever operated door is brick lined and overlaps the door opening. When in open position it can be used as a loading table. The furnace can be controlled either manually or automatically. For manual operation the rheostat is used to maintain the desired temperature in conjunction with the indicating,

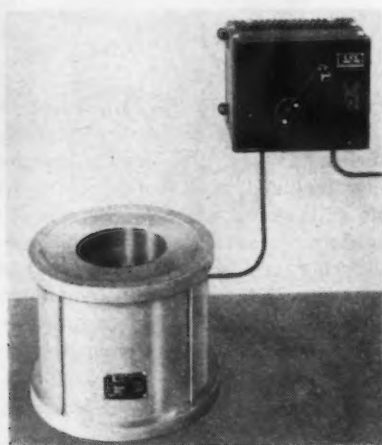
NEW EQUIPMENT



but not controlling type pyrometer. If automatic control is desired it is necessary to use an indicating and controlling pyrometer in conjunction with a magnetic switch.

Tool Hardening Furnace

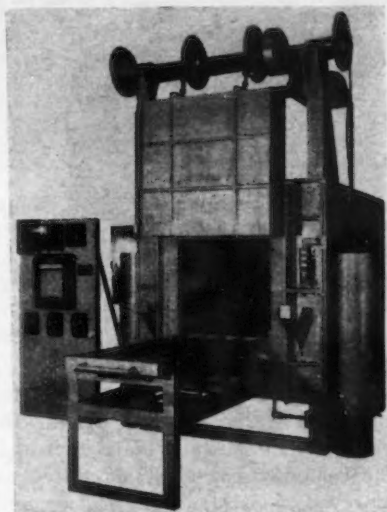
THE Cub bench-type carburizing furnace, introduced by the *Lee Grinder Co.*, 4708 Armitage Avenue, Chicago, is designed for use with accelerated carburizing salts for hardening carbon steel tools without warping. It operates at a maximum temperature of 1600 deg. F., and is equipped with a control unit which combines switch, magnetic circuit breaker and voltage control. The control can be set to "coast" the bath at a low temperature when required for intermittent operation.



Box Type Furnace

A HEAT-TREATING box type furnace, Type BRP-A, has been built by *H. C. Swoboda, Inc.*, Thirteenth Street, New Brighton, Pa. It is said to be suitable for continuous operating temperatures up to 2000 deg. F. and is available in chamber dimensions up to 30 in. square x 4 ft. 6 in. deep. Equipped with a movable loading platform, the unit has a push-button controlled, motor-operated door mechanism. A heater cut-out feature automatically connects and disconnects the furnace upon door opening or closing. An excess-temperature safety feature prevents

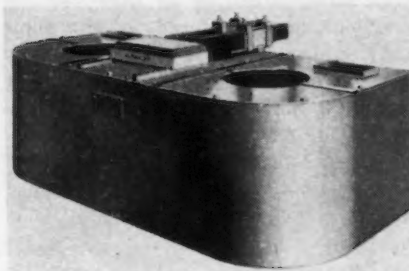
burn-out should controls fail. Standard equipment includes "on-off" type pyrometer control with input regulator for varying the input, to secure any desired heating, holding and cooling program. A time clock installa-



tion provides for turning on equipment at any predetermined time, such as overnight or over the week-end.

Heat Treating Unit

A VERSATILE unit consisting of three pots, for temperature range of 1400 to 1800 deg., 1900 to 2350 deg., and 1000 to 1400 deg. respectively, is offered by the *A. F. Holden Co.*, New Haven, Conn. The first and third pots are removable and interchangeable, permitting several different baths to be used in the same unit. Advantages claimed are: No scale at any temperature; tools are hardened with minimum diameter change, regardless of temperature;



controlled cycle of quenching for maximum physicals; uniformity of hardness and heating; and minimum distortion.

Laboratory Furnaces

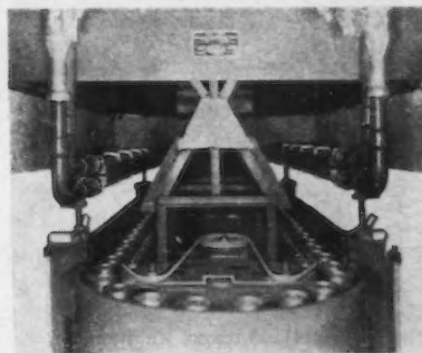
A COMPLETE new line of laboratory furnaces has been developed by the *Lindberg Engineering Co.*, 2444 West Hubbard Street, Chicago 12. These include such types as the

box furnace for drying precipitates, ash determinations, fusions, ignitions, etc.; the combustion tube for carbon determination, standard combustion, organic analyses, etc.; the crucible furnace for melting base metals, thermocouple calibrations, molten salt baths, etc., and hot plates for heating, distilling, boiling, evaporating, etc. They incorporate such features as a convenient door operating mechanism on the box furnace, low voltage, high temperature type heating elements, and the use of a Lindberg "Input Control" for smooth stepless apportioning of heat. They are available in different sizes for operation on 110 or 220 volt a.c. or d.c. current.



Cartridge Case Annealing Machine

TO fill the need for a machine of the continuous type that will produce a uniform and satisfactory anneal before tapering, and also a machine that will do the final mouth annealing on steel cartridge cases, the *Morrison Engineering Co.*, 5003 Euclid Avenue, Cleveland, has designed three models of basically the same machine to handle cases from 37 to 105 mm. and 3-in. anti-aircraft cases. A steel conveyor chain placed on its side is driven by a variable speed drive through a totally enclosed worm gear reducer. The chain carries double row ball bearing mounted spindles

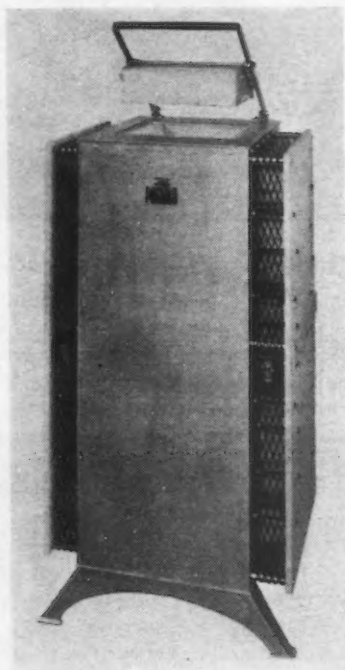


every pitch. The spindles are rotated by a V-belt backed up by adjustable ball-bearing wheels. On top of the rotating spindles are bolted work hold

adaptors, which are interchangeable for different size cases. The burner equipment is of the blast line type with zero governors, proportional mixers and manometers provided for each burner. Loading and unloading is a continuous manual operation at one end of the machine.

Vertical Hardening Furnace

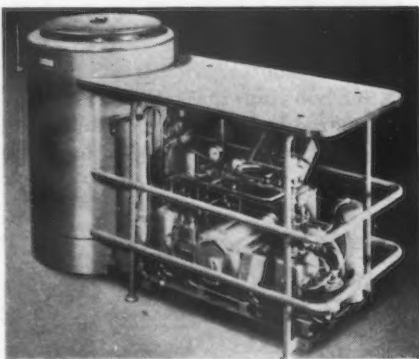
KNOwn as Size No. 4B Model YP, an electric vertical high speed steel hardening furnace has been announced by the *Sentry Co.*, Foxboro, Mass. The steel shell has heavy top and bottom plates, and is amply insulated. It is claimed it will attain a temperature of 2500 deg. F. Heating elements are Globars, properly spaced on both sides of the muffle to provide even heating. The full muffle chamber is of silicon carbide with inside dimensions of 6 x 6 x 40 in. and



is readily removable. The lift type door swings up and back away from the muffle opening, and is balanced so that the hot surface is not exposed to the operator. Terminals are spring mounted and designed for efficient air cooling. All electrical contacts are shielded and provided with safety guards.

Industrial Chilling Unit

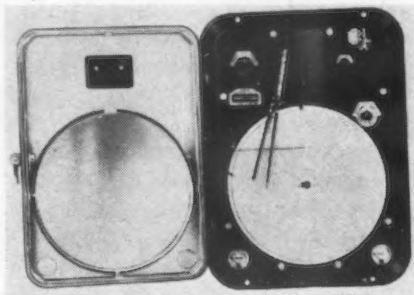
THE Model 70 Deepfreeze 2-stage industrial chilling unit developed by *Motor Products Corp.*, 2301 Davis Street, North Chicago, Ill., has a maximum capacity of -70 deg. F. and removes 800 B.t.u. per hr. at that temperature. The chilling chamber consists of a double wall cold cylinder which entirely surrounds the walls of



the chilling compartment. A $\frac{3}{4}$ -hp. 110-220 volt motor equipped with built-in thermal overload is available, with d.c. motors optional. Two compressors with refrigerated heads, a temperature control which is adjustable from atmospheric temperature to -70 deg., an electrically controlled expansion valve and a dehydrator charged with silica gel are featured. The company has also introduced an improved two-stage refrigeration unit that can reach temperatures as low as -120 deg. F. Its capacity is 1000 B.t.u. when the work is immersed in a convection fluid. The system of three compressors and three motors develops maximum thermal efficiency and eliminates the necessity of water connections and drain facilities. It is also equipped with a table top for convenience and safety.

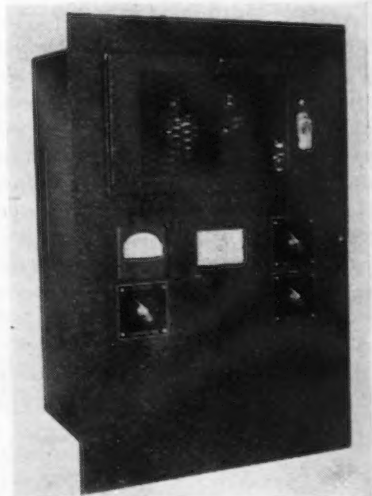
Air-Operated Controller

AN air-operated automatic control instrument, known as convertible free-vane controller, is made by the *Bristol Co.*, Waterbury, Conn., for automatically controlling temperature up to 3600 deg. F., flow, liquid level, pressure, draft humidity, pH value and time program. It operates on the same basic principle as that used in previous models offered by the company, and is designed so that the user can convert from one type of control system to another. The adjustments for fitting the controller to the requirements of the process are located on a dial board above the chart. Types offered are: Monoset (on and off), Ampliset (throttling), Preset, Reset and Magniset.

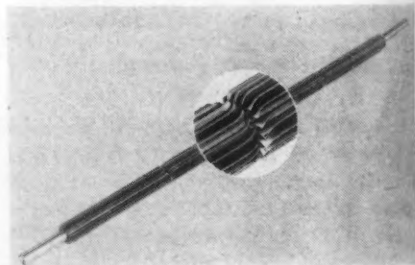


Electronic Temperature Control

THE Furnatron control system to keep variations of resistance furnace temperatures to a minimum has been developed by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. A thermo-couple temperature controller is combined with automatic electronic control of the current of a saturable reactor connected in the supply line of the furnace elements to automatically control the power input into the furnace. The system may be used for control of a single or three-phase furnace. Where a.c. voltage cannot be supplied to the thyatron tubes, an anode transformer is furnished. A



droop corrector is furnished for installations where the rate of material flowing through the furnace changes. Also included is a compensator for line voltage variations. The complete regulator is arranged for flush panel mounting, and is protectively guarded by a time-delay relay, over-temperature mechanisms, surge suppressors, fuses and suitable disconnecting devices.



Heat Exchanger Tubes

THE *Brown Fintube Co.*, 160 Filbert Street, Elyria, Ohio, has added cut and twisted Fintubes to its line. This new development consists of taking standard types of Brown "longitudinal" Fintubes, cutting the fins transversely at desired intervals,

and twisting the ends. This cutting and twisting is said to produce much greater turbulence of the shell side commodity than when straight untwisted fins are used, and increased thermal efficiencies ranging up to 50 per cent in sectional hairpin and other types of heat exchangers in which the shell side commodity is held closely against the Fintube.

Temperature Control

A METHOD of automatic temperature control for the Niagara Aero heat exchanger as used for cooling industrial liquids has been announced by the *Niagara Blower Co.*, 6 East 45th Street, New York. The method is based on controlling the amount of outside air passed through the evaporative cooling chamber rather than altering the flow of liquid being cooled. The cooling effect is directly proportioned to load changes, giving a modulated, nearly straight-line temperature control with no

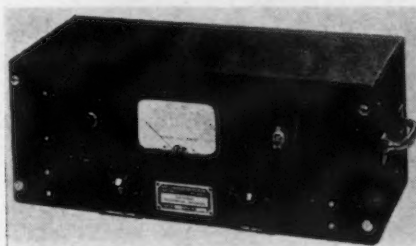


"hunting" action. When the heat exchanger is used to cool oils or compounds, there is no settling of solids, restricted flow or clogging of tubes to interrupt operations, it is said. The apparatus comprises a recirculating air duct to which outside air is admitted by dampers controlled by a thermostat in the liquid line where it is always in contact with the full flow of the liquid being cooled. Spray water temperature is kept above freezing to prevent damage to equipment in cold weather.

Temperature Indicator

AN electronic temperature indicator has been announced by *North American Philips Co., Inc.*, 419 Fourth Avenue, New York. The standard limits of the instrument are from -218 to 1832 deg. F. Five pairs of terminals for five thermocouples are provided, any one of which can be

switched into the circuit so that the temperature at five different points can be read. One hundred feet of



connecting wire between thermocouple and indicator can be used. The unit is designed in a standard radio relay rack and panel built into a metal cabinet.

Percentage Timer

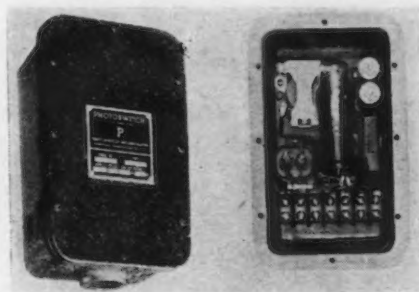
A PERCENTAGE timer which automatically controls the percentage of time at which any a.c. circuit can periodically be closed or opened out of a definite length of a time cycle has been made available by the *R. W. Cramer Co., Inc.*, Centerbrook, Conn. It is said to be particularly applicable where one function bears a definite time relation in percentage or operation of a second function, such as to regulate any input to electrically operated furnaces, ovens or heaters; controlling the proportionate flow of chemicals for boiler feed water treatment, etc. A self-starting synchronous motor drives a cam operated switch mechanism through the medium of an enclosed gear train. The percentage of operating time is a function of the motor driven cam in relation to a similar stationary cam fixed to a calibrated dial. The timers are available for seven different time ranges from 30 sec. to 60 min. total cycle.



Level Controls

PHOTOSWITCH INC., 21 Chestnut Street, Cambridge, Mass., announces a new series of electronic level controls designed particularly for hazardous location mounting and

for use with conductive liquids of an explosive nature. Two models, Types P15NHX for high and P15NLX for low-level control are furnished in a vapor-proof cast iron housing for direct tank installation. A 1-in. nipple, screwed into the hub at the bottom of the control housing, also is screwed into a 1-in. flange on top of the tank. A 1/2-in. brass probe rod projects through the nipple into the tank to the desired depth. The single-pole double-throw switch relay contacts are rated at 1000 watts a.c. and may govern in the output signal lights, pump motors, etc.



Hardness Tester

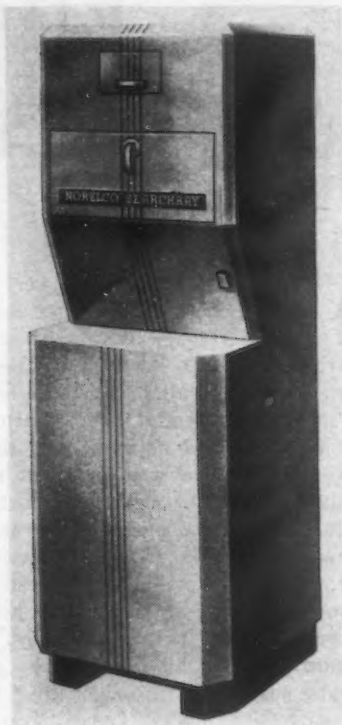
AN improved hardness tester for testing on C. B and other Rockwell scales, developed by *Clark Instrument, Inc.*, 10300 Ford Road, Dearborn, Mich., is available in three models, US8, US12 and US16. Featured are a frictionless spindle, zero drag trip, a dial indicator adjustment and a minor load adjustment. The instrument has a fully enclosed elevating screw with self-lubricating oil reservoir and an adjustable steady rest. It is supplied with diamond cone penetrator and steel ball penetrators. A standard 3 1/2-in. anvil for large flat bearing surface work, a spot anvil for use with test blocks, and a V-anvil for testing round and cylindrical



parts are included, in addition to the two smaller V-anvils that form part of the adjustable steady rest.

X-Ray Apparatus

THE electronic Searchray is said by the manufacturer, the *North American Philips Co., Inc.*, Dobbs Ferry, N. Y., to provide a safe, simple, easy-to-operate X-ray apparatus for the instantaneous fluoroscopic and radiographic examination of parts and finished products of rubber, plastics, ceramics, and light alloys, and for package and luggage inspection at war plants. It is supplied with accessories which permit radiographic examination covering a maximum area of 11 x 14 ft., using standard 12 x 14 in. X-ray film or paper.



Atmosphere Indicator

A NEW furnace atmosphere indicator based on the thermal conductivity method of analysis has been placed on the market by the *Claude S. Gordon Co.*, 15th and Western Avenues, Chicago. The instrument employs the principle described by Palmer and Weaver in technological paper No. 249 published by the Bureau of Standards, U. S. Dept. of Commerce. It is claimed the ideal atmosphere for a given operation can be determined and subsequently reproduced for any similar operation by adjustment of the air-fuel ratio to give the same indicator reading. The indicator is in continuous operation during the entire heating cycle, enabling the operator to detect any at-

mosphere change of consequence which may take place due to variations in the gas supply.

Refractory Coating

FEDERAL REFRACTORIES CORP., Akron, Ohio, announces the development of Cromox, a protective refractory coating material for prolonging the life of fire brick, insulating fire brick, and castable refractories in coal, oil, gas-fired and electric furnaces as well as in non-ferrous melting furnaces. Cromox is a liquid and is easily applied by brush, spray gun or dipping on either hot or cold surfaces. It is said it will withstand temperatures up to 3000 deg. F. and expands and contracts with the refractory to which it is applied. It is also claimed it resists flame erosion, reduces spalling and is unaffected by the attacks of slags, alkalis, acids and moisture.

Lacquer Mask Remover

A MATERIAL known as Microstrip has been developed by *Michigan Chrome & Chemical Co.*, 6340 East Jefferson Avenue, Detroit, for the removal of lacquer used to mask parts for hard chrome plating or for selective hardening. It is claimed Microstrip makes possible quick and easy removal of every trace of lacquer, even that which might have accumulated in small inside diameters or other hard to reach spots. Containing no acids, it will not affect any metal finish. It is also non-toxic. The material is a combination of solvents and is used entirely as a remover. It is not a thinner. It will also remove coatings used for the protection of plating racks.

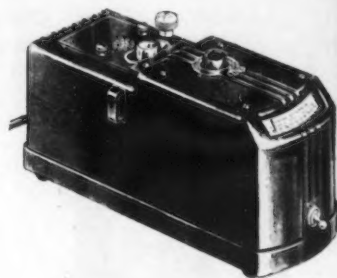
High Temperature Fans

A NEW series of high temperature fans has been designed by *Mahr Mfg. Co.*, 1703 North Second Street, Minneapolis, for handling gases up to 1500 deg. F. They are standard equipment on Mahr furnaces and ovens, and are also offered for replacements or initial installations on other furnaces or ovens. The 6-blade rotor, shaft, bearings and mounting can be pulled out as a unit for inspection or servicing. The fans are assembled in 16 standard discharge positions without cutting, welding or rebuilding. There are 10 sizes from 800 to 40,000 c.f.m.

Photometer

THE *Central Scientific Co.*, 1702 Irving Park Boulevard, Chicago, is introducing a Type B compact fil-

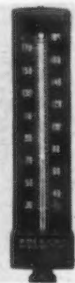
ter photometer for chemical analyses of molybdenum, titanium, vanadium or manganese in steel, lead, copper or iron. The instrument is standardized by determining the transmittancies of a number of solutions which are prepared in accordance with a specific chemical procedure. The transmittancies when plotted on a semi-logarithmic scale against the known concentrations on a linear scale yield an analytical curve or standard with which unknown solutions may be compared. The instrument consists basically of a low voltage light source, an adjustable light aperture, a three-color filter holder, receptacles for tubular or rectangular absorption cells, a single photoelectric cell and a sensitive current measuring instrument with scale reading from 0 to



100 in 50 divisions. A voltage transformer to supply constant intensity of light when operated on a controlled frequency power line is furnished with the 115 volt a.c. instrument.

Glass Thermometer

CLAIMED to incorporate every new improvement added to existing glass thermometers, a pressed steel case glass thermometer is announced by the *American Schaeffer & Budenberg Instrument Div. of Manning, Maxwell & Moore*, Bridgeport, Conn. Back, side and oblique angles are furnished without using the ball joint. The scales are easily readable. The case has been reinforced and the screw which holds the cover has been attached so it cannot come loose. It is said that in actual tests the black suede finish of the case showed no corrosion after 100 hr. in salt spray. The instrument weighs approximately one-third less than standard thermometers of the same size and meets Navy specifications.





History relates that when Faraday demonstrated electricity to Gladstone, the great statesman remarked, "But what earthly good is that?" . . . When Bell's invention of the telephone was reported to U. S. Grant, the general observed, "But what could it ever be good for?"

GLADSTONE and Grant once went into business together. Combining the happy qualities of diplomacy and aggression, they soon did a right brisk business in such staples as ear trumpets, harness and sundries.

They had two bright young fellows working for them named Mike Faraday and Alex Bell, and if ever a company should have gone to town, it was G. G. & Co. For it seems that Mike had been tinkering with harness for a new kind of horsepower, while Alex had invented a new kind of hearing aid . . . but they couldn't interest the management in the future of these things.

So Mike and Alex left and went into business for themselves, and they've been doing nicely ever since. While Gladstone, Grant & Co. stayed in harness and tin hearing aids, and folded like a tent in a heavy wind.

★ ★ ★ ★ ★

There's a point to this little fable: Today there are many promising businesses — in the hands of capable management — that are also going to fold like tents when the post-war trade winds blow.

The success of many businesses after this war will depend upon the planning that is being done now. On any problems involving the use of precision machine tools, we urge you to call upon our engineers — as many of America's leading companies have been doing for more than a century. Call upon them now!

Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Threading Dies

JONES & LAMSON MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.
Profit-producing Machine Tools

Assembly Line . . .

STANLEY H. BRAMS

• Leaning backward on inspections has followed Lockland hue and cry from Truman, impairing output . . . Truck makers edge to heavier vehicles . . . Further easing found in tooling needs.



DETROIT—The uncovering of rich and untapped veins of picturesque and vivid language is none too difficult. Simply ask a manufacturing executive, preferably in the aircraft field, for his confidential opinion of the Truman committee investigation of the Wright plant at Lockland.

Now that the smoke of that explosion has died down and the effects can be analyzed, industrialists are thinking plenty — and heatedly. The burden of some remarks made last week was that the investigation impaired Wright production about as severely as a two-ton block-buster dropped squarely into the middle of the plant.

This is readily apparent in the light of newspaper stories a few days ago reporting that production of aircraft engines at Lockland has now recovered to 50 per cent of the previous level. If recovery to a 50 per cent level is something for public cheering, the ebb to which volume had previously sunk was obviously a shocking one. As a matter of fact, Lockland production was reported down to less than 10 per cent of normal for some time after the Truman inquiry. Considering that this plant was one of the biggest producers of aircraft powerplants, the output loss cannot have failed to affect the entire arms program.

Normalcy may not return for a long time. The aircraft industry's viewpoint is authoritative, though it may

be prejudiced: it holds that Wright will be hard put to override the loss of many key men who quit after the hob-nailed booting which Senator Truman gave the plant. The aircraft industry doesn't have executive personnel to spare, and administrative problems at Wright may be very difficult for some time to come.

The nightmares of the Lockland investigation float before troubled executive eyes through the rest of the aircraft industry, which in these days takes in a good share of the erstwhile automotive industry. Word has been passed along from front offices to the shops to lean over backwards on inspection procedures, even at the expense of production. This is tragically regrettable, but executives are refusing to run the risk of public castigation by laymen critics whose positions give them access to the front pages.

Naturally industry has faults. Any investigating committee could find technical violations of the law in most warplants in the country, and might find indictable offenses in a number of them. But industry, admitting its structural blowholes, wonders whether the province of an investigating committee is to look for sensations which make front page news or to look for ways to correct faults. If the aim is to straighten out faults in armament manufacturing, the committee might have delayed the calling in of the press, and instead put the Wright plant on two-week notice to correct its deficiencies, on pain of disclosure at the end of the period.

ARM Y officials habitually give 30-day notice when they find objectionable practices existing in a plant. The plant can clean house quietly, and damage is minimized. Had the Senate investigators followed such a course at Lockland, production doubtless would have been slowed down during correction of the small proportion of bad practices found. But the shrieking of the Senatorial alarm sirens so scared the living daylight out of everyone within range that either they dropped their work and fled, or stayed and so tightened up that final assembly work apparently starved for lack of inspected and approved components.

The Wright production reductions exist in the face of orders laid down to top industry people a few days ago in a very quiet meeting in the East,

that aircraft production will have to be drastically stepped up in the months ahead. Reports out of this meeting put the amount of increase at 40 per cent during the next six months. Furthermore, some new planes may be coming into production during that time, imposing the drag of changeover on many supplier plants.

As matters look, medium bomber volume will continue to be less significant in the period ahead. Gen. Arnold has said many times that the heavy bombers of today will be the mediums of tomorrow, and perhaps the reduction of emphasis on the current mediums, already in process for several months, is the start of the long range policy on this score. There will not be an end to production of such types as the B-25 and B-26 in the near term, but it appears to be an ultimate probability.

ALLOTMENTS on trucks and trailers for 1944 have been issued by WPB to individual companies by WPB. Actual releases varied slightly from the original figures, reported here last week, with 31,923 vehicles placed and 3,424 yet to be authorized, all the latter to be upwards of 27,000 lb. gross vehicle weight. The heavy truck allocations already made, covering 7,569 units of more than 16,000 lb. g.v.w., plus 1500 off-the-highway jobs, represent production for all of 1944; authorization on the 22,859 medium trucks cover the first six months only. All commitments may be increased if the components and materials situations warrant.

A total of 22 firms share in the business, in contrast to the 13 which were given civilian vehicle quotas for the last half of this year. Of greater interest, however, is the fact that the list of medium truck builders includes Chevrolet and Ford, for whom medium building represents a crowding of their upper limits on size.

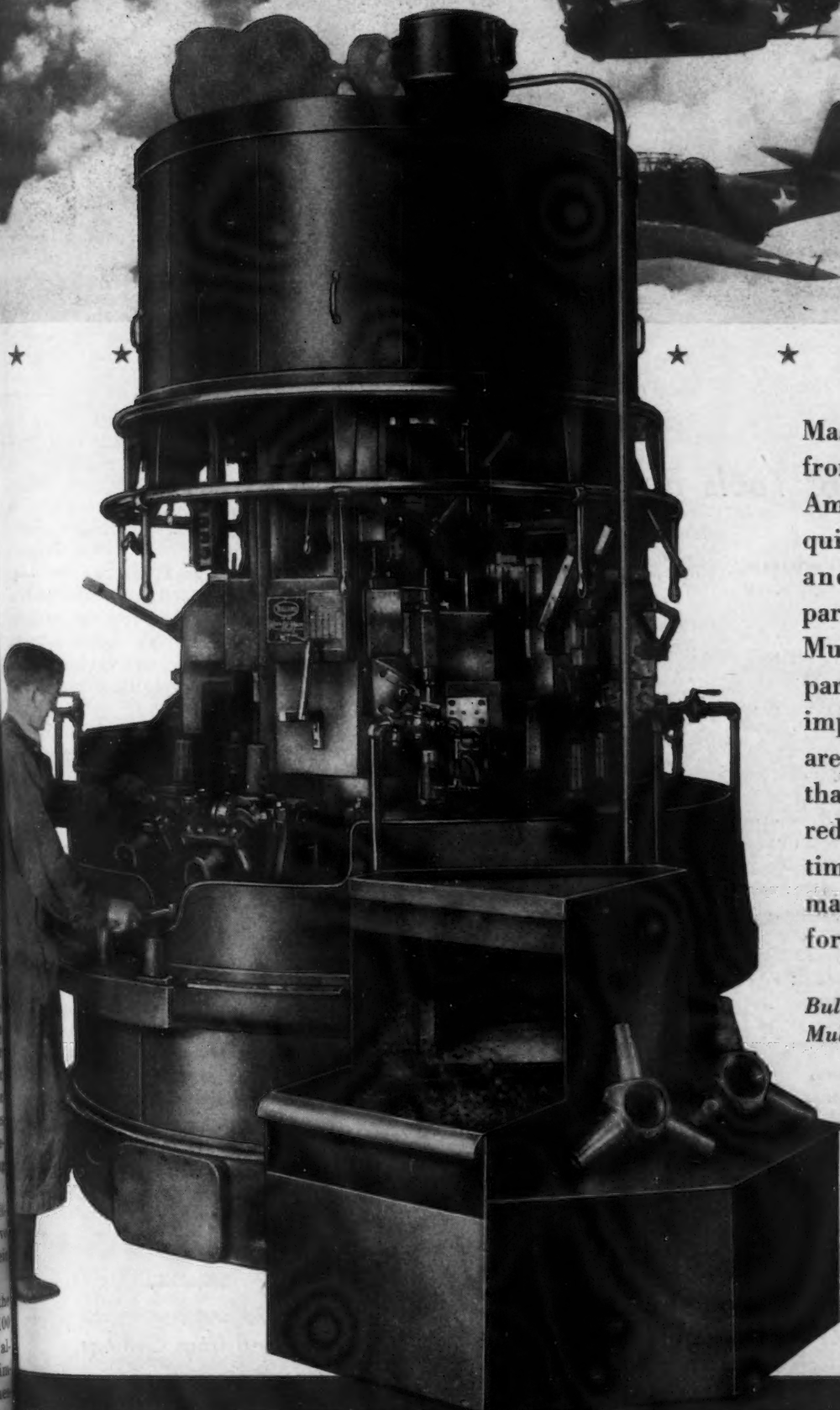
The significance of the whole situation is that truck producers have all been edged upward toward their weight limits.

Release of trailer quotas for the first half of 1944 found about 100 companies sharing in the business, although most of them received unimportant quantities. A serious question exists whether any of these truck and trailer producers will be able to turn out their projected manu-

That These May Fly...



U. S. Navy Official Photo.



Mastery of the air on all fronts—nothing less can be America's goal. That requires ever more planes and more replacement parts — on time. Bullard Mult-Au-Matics at work on parts for engines of every important American plane are doing much to realize that goal . . . by striking reductions of production times, by constantly freeing man-power and floor space for other work.

Bullard 16"-8 Spindle Type "D" Mult-Au-Matic machining propeller hub spider. This shows the third chucking, with 3 changes of position. The Mult-Au-Matic time for 3 positions is 18 min. 5 sec. as compared to the former production time of 5 1/4 hours per piece.

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

facturing during the first half of 1944, and it would seem that carry-overs must be permitted if the schedule is to be met at all. During September one of the biggest truck companies put out inquiries for 7000 tons of steel, but could obtain no delivery promise prior to late next spring. These civilian truck makers are pessimistic about obtaining manufactured parts for their 1944 programs, even after they get steel. As a result, steel to piece out the programs is being brought from warehouses in some of the largest quantities ever placed in the Detroit area for automotive business.

Significant analysis of tool and die facilities in the Detroit area

is provided in an expanded version of the regular weekly report published by the tooling information service of the Automotive Council for War Production.

The information bulletin currently lists 131 tool and die shops. Of these, the first compilation of the sort shows that 28 have designing facilities available. Seventeen are equipped for short run precision production jobs. Die cast molds are produced by two shops, plastic molds by four, and special machinery by 14.

It might be added, in this connection, that the tooling situation continues to become easier in Detroit area.

Shake-Up Hits Ford

• • • L. S. Sheldrick who has functioned as chief engineer of Ford Motor Co. has resigned, it was learned this week. Mr. Sheldrick was one of the veterans of the Ford organization. He is succeeded by D. Roeder, formerly his assistant, and J. J. Wharam, attached to the chassis engineering department, who will share his responsibilities. C. W. Vanranst of the engineering department has also resigned. Mr. Vanranst was credited with designing a tank engine which was submitted to ordinance for testing some time ago. A third resignation was that of E. T. Gregorie, chief body designer, credited with development of the Lincoln Continental.

Redistribution of Tools Being Effected

Cleveland

• • • In line with the WPB program of machine tool redistribution, much of which equipment is government owned, the Cleveland region of WPB during the latter half of August set a new record. Transfer of \$605,488 worth of idle machine tools and capital equipment to active service was accomplished.

With the national list of machine tools available for transfer currently running about 6000 units per month, the WPB tools branch working through the various regional offices, is extending every effort to place such available equipment into production where it is needed. Under present regulations closer control is extended the WPB on the manufacture of new equipment. Priorities for new ma-

chine tools are given for essentially needed new machines when suitable existing tools are not available from the idle tool supplies that exist throughout the country, or in some instances, when subcontracting such work is not desirable. The transfer of machine tools, either by WPB or the services fills a substantial portion of the present machine tool requirements.

As the bulk of the heavy buying of machine tools for setting up production is passed, those machine tools now needed consist mainly of fill-in tools to better round out production schedules or such tools as may be needed after a change in production contracts. In such cases, WPB's aid is vital. It affords a manufacturer far quicker delivery on such tools than could be obtained on new tools from manufacturers and it saves critical materials and manpower that would have to go into new tools. Primarily, however, time saved in obtaining required machinery and the utilization of existing machine tool equipment is the chief function of redistribution.

In spite of the general decline in machine tool production, there still remain certain types of tools, the demand for which continues in substantial volume and therefore still represents production bottlenecks. The most recent critical tools list issued by the WPB shows the following items as being badly needed: Precision boring machines, both horizontal and vertical; gear cutting and

gear finishing equipment, die sinking equipment, internal grinders, thread grinders, universal tool and cutter grinders, universal external grinders, radial drills, 5 ft. and larger; horizontal shapers, 24-in. and larger; horizontal turret lathes up to 3-in. round bar capacity, single-spindle automatic screw machines up to 1-in. capacity and multiple spindle units up to 3-in. capacity, and various types of forging and upsetting machines, 3-in. and over.

WPB deals mainly in government-owned equipment, with available units reported monthly to the WPB tools branch by the various agencies. Many of these government-owned machines are sold outright to a manufacturer, but transfers of government-owned equipment to a war plant are often effected, with the equipment still remaining property of the government. In cases where the equipment is sold, there is a nominal price set on it. A recent amendment to OPA price regulations on used machinery governs the prices upon which such transfers for sale are made. However when the machine is obtained on a transfer basis, the new user will be charged a rental fee for the time it is in use in his plant. WPB is interested in listings of any holder who has good machines available for sale. These should be reported to the nearest WPB regional office.

Optical Fluorspar Exempted from Ceilings

• • • Optical grades of fluorspar were exempted from price control by OPA last week by Amendment No. 1 to Maximum Price Regulation No. 125 which becomes effective Sept. 22.

1944 Civilian Truck Quotas

Company	Medium Trucks	Heavy Trucks	Off-Highway	Total
Autocar	...	700	...	700
Brockway	50	250	...	300
Chevrolet	8449	...	...	8449
Corbitt	...	75	...	75
Dart	...	16	100	116
Diamond T	517	300	...	817
Dodge	2451	312	...	2763
Duplex	...	10	...	10
Euclid	...	...	487	487
Ford	7169	...	...	7169
4-Wheel Drive	...	156	117	273
GMC	1376	1020	...	2396
International	2509	2000	...	4509
Koehring	...	59	...	59
Linn	...	55	...	55
Mack	338	1069	257	1664
Oshkosh	...	100	117	217
Peterbilt	...	75	203	278
Reo	...	83	...	83
Sterling	...	140	105	245
Walter	...	109	...	109
White	...	1154	...	1154
Totals	22,859	7569	1500	31,928
To be assigned	...	3424	...	3424

NOT A CLAIM
NOT AN OPINION

But a Fact..

You can get better, faster and
more accurate threading and beat
your production schedules with

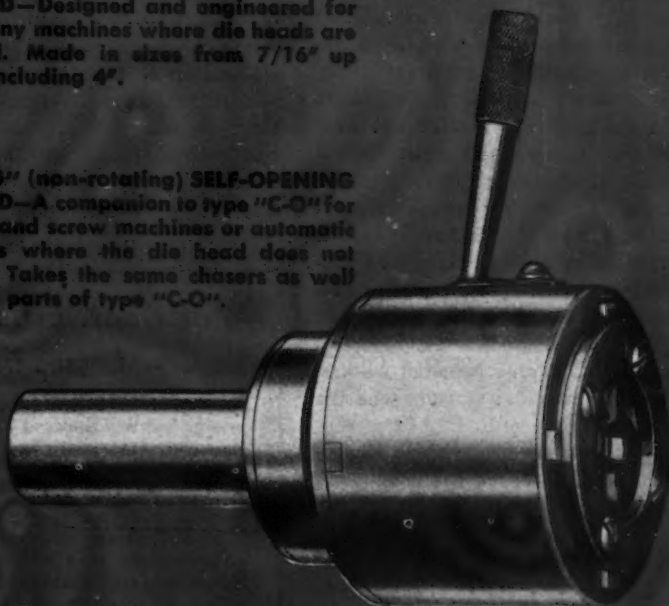
MURCHEY

Threading Tools

4 WEEKS' DELIVERY



**TYPE "C-O" (rotating) SELF-OPENING
DIE HEAD**—Designed and engineered for
use on any machines where die heads are
revolved. Made in sizes from 7/16" up
to and including 4".



**TYPE "G" (non-rotating) SELF-OPENING
DIE HEAD**—A companion to type "C-O" for
use on hand screw machines or automatic
machines where the die head does not
revolve. Takes the same chasers as well
as many parts of type "C-O".

Every day, and in the face of ex-
acting government specifications,
Murchey self-opening dies and col-
lapsible taps are proving this on
threaded parts for tanks, guns,
bombs and shells. They are cutting
threads to class 3 fits in aircraft
parts, tapping the noses of shells
and bombs and threading the base
end of anti-aircraft shells. The rec-
ord of these tools is outstanding.

Write for literature on type "C-O", type "G" and
on our New Collapsible Machine Tap Type "B-M".
Also for folders on Murchey Milling Machines, Shell
Tapping Machines and Roller Pipe Cutting-off Ma-
chines. You need this literature in your files for
ready reference. Address Dept. I.

**MURCHEY MACHINE
& TOOL CO.
DETROIT 26, MICHIGAN**

MURCHEY

**Always remember—
machines must be in
perfect alignment to
cut perfect threads.**

• Ingot capacity held sufficient to assure Allied victory . . . Electric furnace capacity for alloy steel expected to be 6,500,000 tons by end of year . . . Reduction of alloy steel inventories causes concern in WPB.



WASHINGTON—In the scramble to prepare America for war, it was fully realized that demands for steel would reach unprecedented proportions. Not only would this country have to turn out unequaled tonnages to build up its own weak war machine, but it had to furnish vast quantities for Great Britain and Russia and as much as it possibly could get through to China. Smaller Allies also drew on the United States for steel.

This country in the truest sense became an arsenal. Unlike the first World War it became a great global supplier. It could not draw on England and France for weapons as it did in the earlier war. It had to hasten construction of new capacity and produce in increased quantities to meet the strain. It had to face dangerous and difficult transportation over broad reaches of submarine infested waters.

In this serious situation, wherein the United States and its Allies were fighting for their very existence, it was natural that desperate cries were made for more steel and still more steel. There was no time or even means to arrange a balance of demand and supply—nor is there today. War shatters that law just as it shatters all laws. Hence, while a steel expansion program was devised with a limitation, tentative at that, of a 10,000-ton increase in ingot capacity, there were differences of opinion in the industry and in government whether that increase was too much or too little. With the progress of the war

now definitely turned in favor of the Allies, this difference now has been pretty well dissolved. The predominating view is that finally the capacity added and to be completed will be sufficient to assure Allied victory.

There are those who think that capacity now completed is enough to supply all war needs. Moreover there is a view that, as far as the uncertainties of war make it possible, the pattern of the military program is so well shaped and the trend of the war so satisfactory that the day of civilian production on a pre-war scale is not far distant. This thinking, however, is discouraged by WPB and the armed services. It is condemned as dangerous for fear that it will develop a psychological letdown at the cost of production that is urgently vital to victory. However, there is little doubt at WPB that when Allied victory in Europe comes, the military demand for steel will decline measurably so that the most essential civilian needs can be satisfied.

THINKING in terms of early and large civilian supplies has grown partly out of readjustments of war contracts with cutbacks and cancellations. These cutbacks and cancellations have afforded some civilian outlets. But these may prove to be only temporary, for where there has been slackening in some programs by reason of changes in methods, rather than in intensity of warfare, there has been a tightening and growth of demand in other directions. This fluctuating line of demand for specific

kinds of steel may be expected to endure until the war ends. The downward curve may at any time come to an abrupt end and take a sharp ascent.

TO say, as has been said, that the tank is obsolete, is an overstatement. Powerful mobile guns have temporarily limited its uses. But the tide of war just now has taken a turn that makes the tank a lesser factor in warfare than it was when vast numbers were rumbling into battle over the deserts of Africa. The upshot was a 40 per cent cutback in tank production and a diminished demand for alloy steel to make that weapon.

Alloy steel is made in both the electric and the open hearth furnace. Due to the pressure for electric furnace expansion annual capacity for making steel by that process has risen from 2,600,000 tons on Jan. 1, 1941, to approximately 5,500,000 tons at present, an increase of 2,900,000 tons, or more than 100 per cent. By the end of the current year, this capacity, if the program is completed, will be 6,500,000 tons, leaving 1,000,000 tons yet to be added.

Simultaneously with the drop in demand for alloy steel there is a stronger demand for carbon steel. Despite the great expansion in open-hearth capacity, near-capacity production is proving insufficient to meet needs for some rolled products, notably plates and sheets.

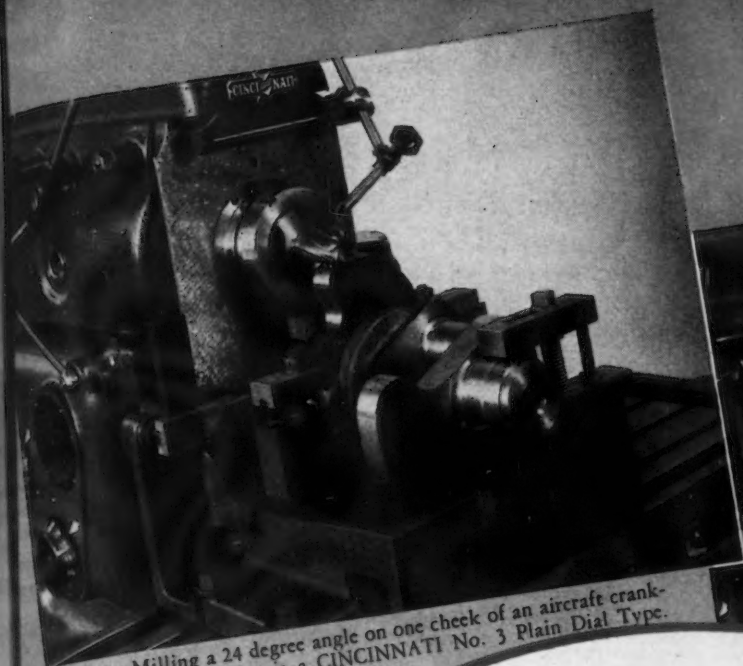
THE easing of alloy steel demand has developed a tendency to reduce inventories and imports of critical materials for electric furnaces. WPB therefore has made an appeal to put the situation back into balance and thereby make the fullest use of all capacity. WPB Steel Division Director John T. Whiting says that for every ton of alloy steel displaced in the open hearth furnace one-and-one third tons of carbon steel can be made. This, of course, is not an exact formula inasmuch as there are variations between plants.

WPB is urging alloy consumers who are drawing on the open hearth to switch to electric furnaces. This will free the former for the much-needed greater output of carbon steel and utilize the latter for the purpose for which it was designed—that of making high quality steel. Carbon steel can be supplied in greater abundance if the open hearth is engaged more

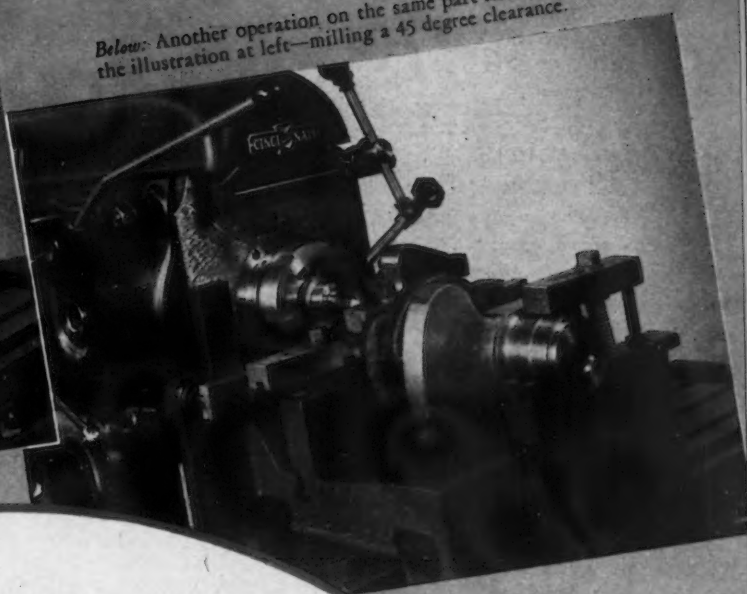
War Dept. Estimates Our Losses in Sicily

• • • The War Department made public Sept. 15 the percentages of certain important items of American military equipment lost during the successful Sicilian campaign.

In operations in Sicily we lost 13 per cent of all the 155 mm. howitzers we landed, 46 per cent of all 57 mm. guns, 36 per cent of the motor carriages for our 75 mm. guns, 22 per cent of the carriages for our 105 mm. howitzers, and 54 per cent of the carriages for our 37 mm. guns. We also lost 7 per cent of our light tanks; 8 per cent of our medium tanks. We lost nearly 13 per cent of our 37 mm. guns.



Above: Milling a 24 degree angle on one cheek of an aircraft crankshaft. The machine is a CINCINNATI No. 3 Plain Dial Type.



Below: Another operation on the same part shown in the illustration at left—milling a 45 degree clearance.

THIS EQUIPMENT SAVES SET-UP TIME *...in Several Ways*

- The CINCINNATI No. 3 Plain Dial Type Miller and the CINCINNATI engineered fixture—shown in the two illustrations above—team up to handle two distinct milling operations on aircraft crankshafts with a minimum of set-up time.

In the first setting, a 45° clearance is milled for a bearing collar. At the completion of this operation, adjustable fixture elements are rearranged, the cutters changed by means of the quick change collet, the work adjusted to the cutter, and everything's all set for the next operation of milling a 24° angle on one cheek.

Several machine characteristics contribute towards the economical production of these parts: the right speed for the type and diameter of cutter, quickly selected at the front (or rear, if desired), and without effort . . . the right feed for the material and cutter, quickly selected at the front (or rear, if desired) and without effort . . . rapid adjustment of work to cutter with three way power rapid traverse.

Time-saving teams of fixture and machine are specialties with CINCINNATI Service Engineers. They'll be glad to analyze your milling problems, and you may be sure that they will offer a solution which will please you.



CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

ROOM AND MANUFACTURING MILLING MACHINES... SURFACE BROACHING MACHINES... CUTTER SHARPENING MACHINES

Remember Sponge Iron?—Studies Continue

• • • Sponge iron work being carried on by the Bureau of Mines is still purely in an experimental stage, with the 30-ton a day Laramie, Wyo., plant, authorized a year ago, not yet fully constructed because of equipment shortages. Apparently satisfactory sponge iron has been made, by the bureau, however, under the Republic Steel Co. aegis in a kiln of the Binghamton Brick Co., Binghamton, N. Y., using limonite ores from Bennington, Vt., and Republic's Chateaugay magnetite.

The principal purpose of the Binghamton work, which in its present stage is not considered economically practicable, has been to investigate the possibilities of making good sponge iron in other tunnel and periodic brick kilns. The work will this year be extended to at least one, and possibly five additional kilns in other localities.

The bureau now has in work the following additional projects, financed by its appropriation last year of \$400,000 (at first reported to be \$600,000) for sponge iron development:

A rotary kiln at Boulder City, Cal., using existing facilities to test ores preliminary to operations at Laramie.

A gaseous reduction furnace, using reformed natural gas, at Madaras Steel Co., Longview, Texas.

A small rotary kiln at the Bureau's Pittsburgh station, for gathering fundamental data, particularly on elimination of impurities.

A larger scale investigation of the Pittsburgh work, in a 1-ton-a-day rotary kiln at Plastic Metals, Inc., Johnstown, Pa., with emphasis on a device to cool the iron out of contact with air.

Gas fired furnaces at U. S. Quarry Tile Co., Canton, Ohio, where materials for and types of containers, and sulphur control are being studied.

A small direct fired furnace at the bureau's Minneapolis station where reduction of briquettes of ore, coal and binder is being investigated.

Small scale control work to provide data for larger projects in the East, at the bureau's College Park, Md., experimental station.

fully on carbon steel and the electric furnace given a heavier burden in producing alloy steel that now is being made in the open hearth furnace. Approximately 62 per cent of the present alloy production comes from open hearth furnaces.

Changing to the electric furnace will mean a \$10 a ton higher price but in war, costs are a secondary, if

any, consideration. The higher price obviously would be covered in contracts. The tremendous demand for carbon steel is indicated by the fact that the annual capacity for this kind of tonnage has been increased from 74,500,000 tons on Jan. 1, 1941, to 81,800,000 tons at present, with the expansion program only 60 per cent complete.

Auto Graveyard Shipments Decrease

Washington

• • • H. M. Faust, Director of the WPB Salvage Division, announced on Tuesday that scrap shipments out of graveyards in August amounted to 86,882 net tons, a 10.4 per cent decrease compared with July when shipments amounted to 96,967 tons. The August figure is the lowest in recent months, and far below the averages attained in the first six months of 1943.

Mr. Faust said that possibly misinterpretation by auto wreckers of Order M-311 was responsible to some extent for the decline of shipments from graveyards. He called attention to the fact that car inventories in the graveyards are approximately the same as they were at the beginning of the year. He also emphasized the fact that M-311 contains no provisions which prevent the scrapping and shipping of material not specifically covered in the order.

Car purchases by auto wreckers amounted to 60,312 cars in August compared with the July figure of 60,750 cars. The August purchase figure, Mr. Faust stated, although only slightly under that of July, is considerably below that for the months previous to June 1, when cars purchased by auto wreckers averaged approximately 85,000 cars per month.

Mr. Faust stressed the fact that auto wreckers should continue to buy and cut up old jalopies which no longer offer efficient transportation and from which the serviceable parts have been salvaged.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Stepping Up...and Keeping Up the STEEL CUTTING PRODUCTION of the United Nations



WITH the outbreak of war in 1939, the Allied Nations—abruptly cut off from Germany as a principal source of supply for carbides—diverted the full flood of their carbide demands to the United States.

Fortunately, American industry had established—as far back as 1928—its own independent sources of supply. These American suppliers were ready to meet the emergency with a background of 10 years' experience in the development, manufacture and application of this urgently needed material. They had the skill, the equipment, and a generous margin of reserve capacity.

To the hard pressed Allied Nations—struggling to offset the tremendous output of a German war production long since tooled with carbide by *official decree*—went tons of American carbides in steadily increasing quantities. Foresight and preparedness enabled American carbide manufacturers to fill this urgent need and at the same time meet the pyramiding demands of domestic industries.

Today, you will find carbides a factor of vital importance in stepping up and keeping up the production of not only the United States but also such countries as England, Russia, Australia, Canada, China, India, Mexico and many others among the United Nations.

The full extent to which carbides are being used in the cause of victory is difficult to visualize. Carboloy Company production alone, for example,

is at an annual rate 45 times greater than that of any pre-war year. Monthly production of carbides—formerly measured in pounds—can today be expressed in tons—many tons per month! Yet the average carbide tool contains but a fraction of an ounce of carbide at the cutting edge—and a single tool during its usable life machines hundreds of parts for the implements of war. Particularly important is the use of carbides for cutting steel—a major field of use for Carboloy tools. (More than 60% of the Carboloy Cemented Carbide produced today for machining purposes is for cutting steel.)

A high order of performance—so high as to have been once considered incredible—is now commonly expected, and obtained, with carbides. Such things as increases in output of 3 to 1, lengthened tool life of 10 to 1, finish cuts that eliminate arduous grinding, machining of former “non-machineable” alloys, reductions of 25%, 50%, 75% in machining costs—results such as these are every-day occurrences in war production today.

This widespread use of carbides in war, indicates a new era of production economy when normal commerce returns. Manufacturers who have converted to carbides to meet the present emergency will then have at their immediate disposal an economic weapon of unusual advantage in seeking world markets.

Carboloy Company, Inc., Detroit, Mich.

Authorized Distributors: Canadian General Electric Co., Ltd., Toronto.
Foreign Sales: International General Electric Co., Schenectady, N. Y.



CARBOLOY

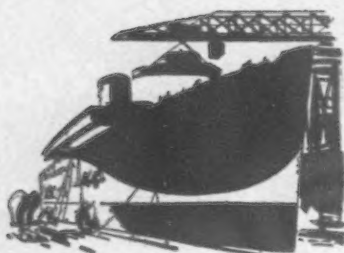
TRADEMARK



TITANIUM — TANTALUM — TUNGSTEN CARBIDES

WEST COAST . . . OSGOOD MURDOCK

• Pacific Tube opens first West Coast tube mill . . . Will turn out seamless up to 4.5 in. o.d. . . . Manpower plan studied with reserve . . . Steel warehouse pool ended.



LOS ANGELES—When the first three-quarter inch, 32 ft. long steel tube made its final pass through the old but carefully reconditioned draw benches in the feverishly built new plant of the Pacific Tube Co. one day last June, those who particularly follow the tubular and pipe market for steel products realized that a new page was being turned in the metal industry of the far West.

Although it is probable that between 10 and 15 per cent of all steel products sold west of the Rocky Mountains in normal times are tubular, nevertheless no steel had ever been rolled nor had any seamless tube been previously drawn west of the Great Lakes. In spite of insistent war demands of the airframe industry of the West Coast, and of petroleum refining and synthetic rubber plants for heat exchanger tubing, nevertheless the erection of a good-sized plant during wartime, and at the wrong end of a hard-pressed domestic supply line, has been an almost miraculous achievement in expediting and overcoming obstacles in procedure. Major credit for this goes to Forrest G. Harmon, dynamic executive vice-president.

Harmon for a number of years was manager of the tubular department of the Columbia Steel Co. for the Pacific Coast and more recently was assistant general manager of sales. Almost two years ago he set for himself the task of establishing an independent tube mill on the Pacific

Coast. After ten months deliberation the Defense Plant Corp. and the Plant Facilities Section of WPB granted authorization on Feb. 22, with the proviso that the plant must be in operation in 90 days. This was actually the eighth of eight emergency tube mills and additions authorized.

Ground was broken March 2 and 67 days later the first tube was drawn. There were only 80 days between formal authorization and first production. The last mill authorized and the farthest away was the quickest to draw tubes.

On a 17½-acre tract of land in the eastern suburbs of Los Angeles, flanked by the big plants of U. S. Rubber and B. F. Goodrich Co., there are already 150,000 sq. ft. under roof and over a smooth concrete flooring. One main building 100 by 550 ft. was dismantled and shipped from Galveston, Texas. Steel for two other buildings, the pickle house and billet yard, was also dismantled in Galveston and shipped. An office building complete with two vaults was sliced in three and trundled up from Torrance, where it had previously served an oil company, 25 or 30 miles away.

Crane Co.'s big old building on the site was taken over and incorporated. Nine draw benches, some of them originally installed early in the century for Foster-Wheeler in New York, were secured, reconditioned and installed. Like the old Rainbow Division, nearly every state is represented in the facilities and equipment of this fighting outfit.

From hot-rolled, pierced billets

which must now be shipped from the East or middle West, the plant is producing seamless, cold-drawn tubing from 0.5 to 4.5 in. and will produce welded tubing from one-half to 0.5 to 2.5 in. The welding equipment is just being installed. Within three months the plant will have 250,000 ft. a day drawing capacity. There are now nine draw benches, one of 150,000 lb. draw capacity, four 50,000 lb. and four 20,000 lb.

Clarence A. Warden, president of the Superior Tube Co., Norristown, Pa., is president of the company and his son, Clarence A. Warden, Jr., is vice-president and treasurer. R. H. Gable, vice-president in charge of engineering of Pacific, is also serving in similar capacity for Superior. Production superintendent is C. H. Wallis, with 34 years background in cold-drawn tubing and for 16 years superintendent of the Cold Draw Department for National Tube at Elwood City, Pa.

FINGERS are crossed and ears hug the ground ever since War Mobilization Director Byrnes announced from Washington a "West Coast Manpower Program" which attempts further to control hiring and threatens to achieve a measure of universal service. As usual "detailed arrangements for carrying the program into effect are still to be made." But the general purpose is to provide 160,000 additional persons in shipbuilding and 100,000 more in aircraft production, approximately a 25 per cent addition to the labor force. It is now understood that aircraft will occupy the inside lane, high-octane gasoline facilities next, and shipbuilding third.

In general it is hoped that the plan can be carried out chiefly by an area production urgency committee to supervise placement of contracts and an area manpower priorities committee to decide which plants or industries get preference in obtaining additional workers. Management, labor and the public will be consulted by these committees.

What worked well in Buffalo for a single area may be difficult to apply to the West Coast situation, where shortages are more severe, housing more desperate, distances gigantic

CMP Red Tape Scored By Aircraft Official

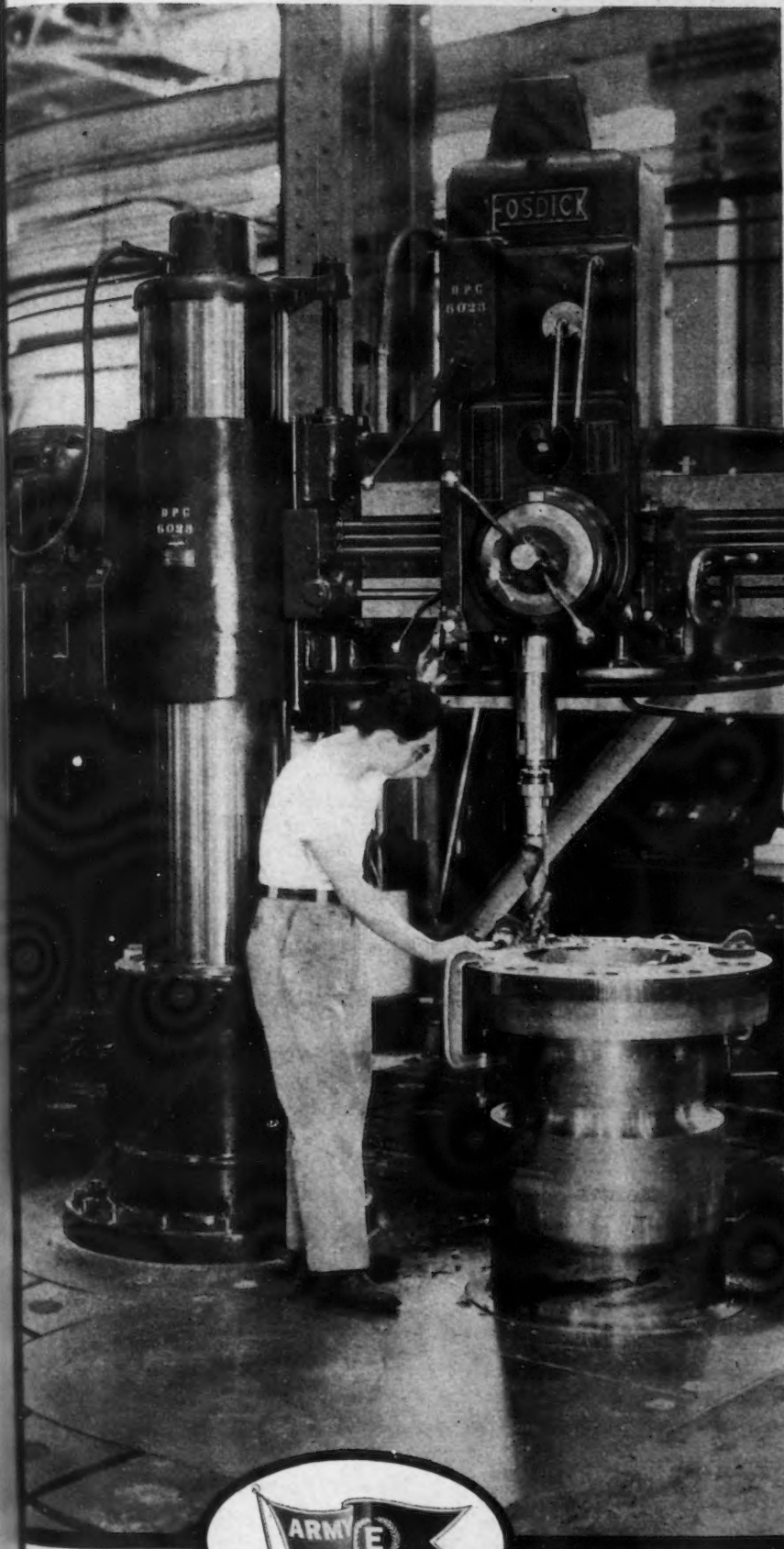
• • • Genial, fast-talking Ralph S. Damon, president of Republic Aviation Corp., took a healthy wallop at CMP in testifying before the Ways and Means Committee, last week.

"CMP restricts aircraft production by tying up the procurement of many materials in a mass of red tape," said Mr. Damon.

Incidentally, Mr. Damon revealed that 11 aircraft companies had \$1,194,000,000 worth of inventory in December, 1942.

A Fosdick Radial

IS NO SECRET
WEAPON
ON THE
HOME FRONT

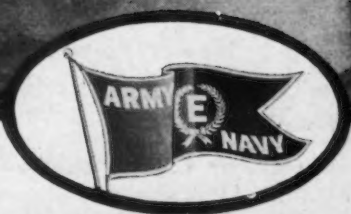


• In hundreds of shops, working day and night to keep ahead of the demands of our scattered war fronts, Fosdick Radials are turning out vital parts on three shift schedules.

Rigidity — power — ease of operation — flexibility mark them as dependable machine tools for a host of precision drilling — boring — reaming — facing and allied operations.

Here a Fosdick Radial is drilling a series of holes in a flange. A template is used to enable operator to accurately locate position of holes quickly. The operator can easily reach all holes with the drill with very little walking. All controls are within easy reach from operating position.

For complete mechanical details write for Fosdick Radial Drill Bulletin R.D.I. or consult a Fosdick Representative on your radial drill problems.

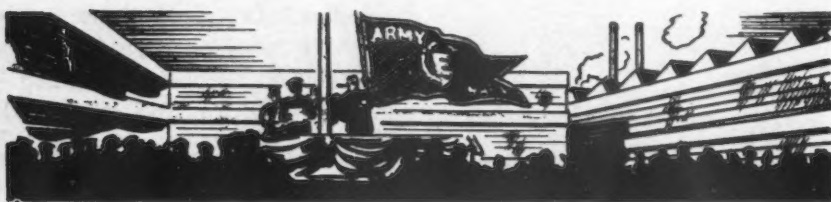


FOSDICK MACHINE TOOL COMPANY
CINCINNATI . . . OHIO

and provincial jealousies and inter-area rivalries a further complication.

SO satisfactory and well balanced are steel warehouse stocks here that the pooled central inventory maintained at San Francisco by the redistribution branch of the War Production Board for the last six months is being discontinued. This central inventory was first proposed a year ago when the situation was desperate, but it was not instituted until April when the situation began to improve with the inauguration of CMP. At the start only 50 per cent of inquiries could be filled, but in August 100 per cent of all inquiries were handled. As each stock improved, inquiries decreased until they have become negligible. Through the inventory during its six months of operation 6500 tons of material were purchased.

The new OPA zone and destination ceiling price schedule has been delayed in publication, but is expected to be announced in time to become effective on the West Coast and in the southern areas by about October 1. Complicated and involved calculations are being made, covering freight allowances to equalize between basing points.



... Cited for Awards ...

••• The following companies have been recently awarded the Army-Navy "E" for outstanding records in war production:

Aro Equipment Corp., Bryan, Ohio, plant (renewal star).
 Traylor Engineering & Mfg. Co., Allentown, Pa.
 Jarecki Machine & Tool Co., Grand Rapids, Mich.
 General Motors Corp., Aeroproducts Division, Dayton, Ohio; Fisher Body Division; Ternstedt Mfg. Division No. 9, Detroit, and Oldsmobile Division Kansas City plant.
 Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio.
 Champion Spark Plug Co., Toledo.
 Cushman Motor Works, Lincoln, Neb.
 Electro-Motive Mfg. Co., Willimantic, Conn.
 Hoof Products Co., Chicago.
 Hydramatic Machine Corp., New York.
 Independent Engineering Co., O'Fallon, Ill., plant.

Kent Metal & Chemical Works, Edgewater, N. J.

Line Material Co. of Pennsylvania, East Stroudsburg, Pa.

Mid-West Forging & Mfg. Co., Chicago Heights, Ill.

Novocol Chemical Mfg. Co., Inc., Brooklyn.

Scott & Williams, Inc., Laconia, N. H.

United Aircraft Products, Inc., Vernon, Cal.

Hamilton Foundry & Machine Co., Hamilton, Ohio.

Autocar Co., Ardmore, Pa.

MacWhyte Wire Rope Co., Kenosha, Wis. (renewal).

Wyckoff Drawn Steel Co., plants at Ambridge, Pa., and Chicago (third star).

Jenkins Bros., Bridgeport, Conn. (second star).

Diebold, Inc., Canton, Ohio (second star).

Arma Corp., Brooklyn (fourth star).

Ford Instrument Co., Inc., Long Island City (fourth star).

Keuffel & Esser Co., Hoboken, N. J. (fourth star).

End-Use Analysis by Agency Symbol Asked

Washington

••• In announcing Interpretation No. 18 to CMP Regulation No. 1 last week, WPB pointed out that manufacturers operating under CMP must not attempt to trace the ultimate end use of their products for the purpose of indicating that claimant agency pattern which is required in Section A of form CMP-4B application.

Applicants were told that they must analyze orders on the basis of claimant agency symbols appearing on their customers' orders in making application for controlled materials. If no claimant symbol appears, the order must be reported "unidentified."

For example, if an applicant receives an order with a preference rating bearing the symbol B-1, he should report this under the symbol B, even if he knows that particular order is for a component of a product which eventually will be sold to the Navy.

A person who receives a rated order must accept and fill it in accordance with the terms of Priorities Regulation No. 1, whether or not it is identified by a claimant agency symbol. He may not assume that his customer is required to show a symbol on his

order since in many cases it is not necessary to do so in applying and extending a rating.

Attention was directed to the provisions of paragraph (f) of CMP Regulation No. 3 and paragraph (z) of CMP Regulation No. 6, which require compulsory use of claimant agency symbols for purposes of identification on certain rated orders. Class B product producers are permitted to call attention of their customers to these provisions, WPB said.

Three Orders Affect Conveyors, Farm Equipment

Washington

••• WPB last Thursday amended L-193 so as to permit "upstream sales" of unused conveying machinery and mechanical transmission equipment without ratings. Formerly the order restricted purchase orders to those with AA-5 or higher ratings.

An amendment to L-297, covering portable conveyors, modified certain restrictions on the use of metals. Sub-base and supports for internal combustion engines and clutches, either attached or detached from the engine, were excluded from restrictions on weight of metal specified in Schedule A attached to the order.

An amendment to L-123 extended to Dec. 1, exemptions from rating restrictions for items of general industrial equipment frequently used on farms. Farmers may obtain these items with A-1-c or higher ratings by certifying to their dealers that they are farmers and need the equipment in operating their farms.

New Price Control Set on Idle Stock Sales

Washington

••• Anticipating large tonnages of steel to be involved in redistribution as a result of contract terminations and cut-backs, OPA ruled last Saturday that idle or frozen materials sales should in the future be governed by Maximum Price Regulation No. 204.

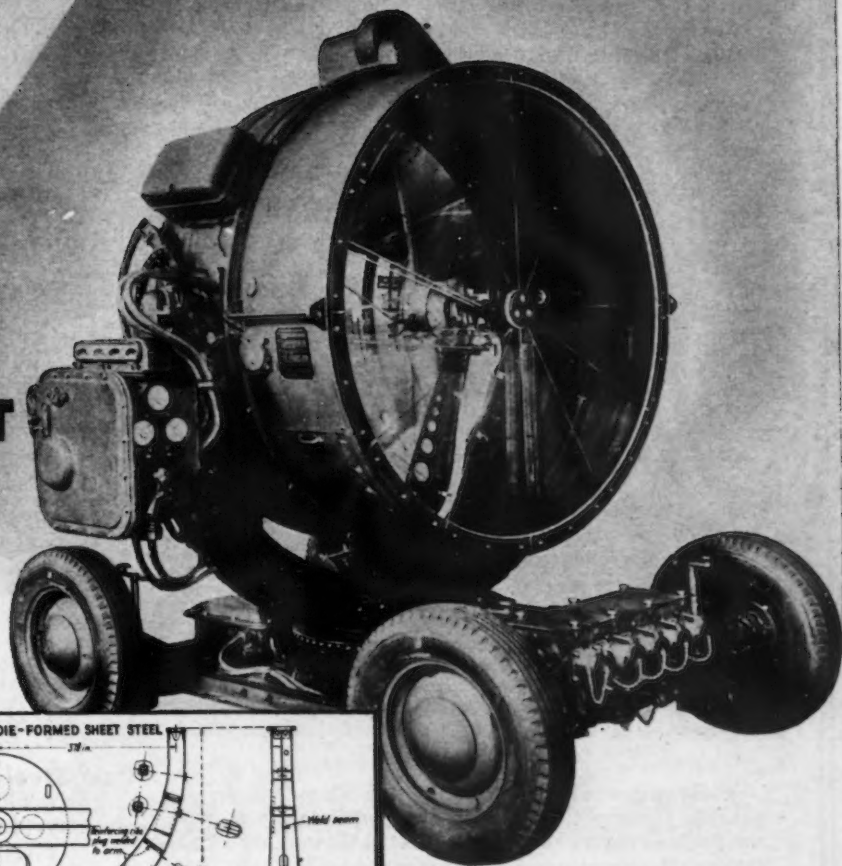
New WPB Bulletin to Give Complete Priorities Information

Washington

••• A new publication, WPB titled "Products and Priorities," will include all information formerly contained in "Priorities" and in "Product Assignments," both of which will be discontinued.

SAVED: 700 POUNDS OF SCARCE METAL

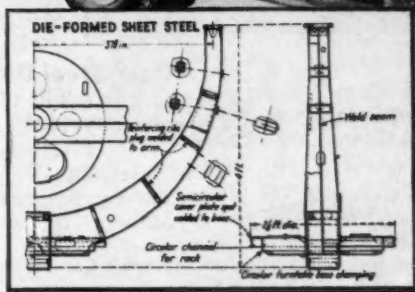
IN THIS REDESIGNED SEARCHLIGHT



This is the story of another redesign idea that is saving many tons of a scarce alloy.

The Army called for a big supply of powerful 60-inch diameter searchlights. Formerly they were made of a cast alloy urgently needed in other war equipment. So alert designers came up with a new model—made of die-formed sheet steel.

Weight went up less than 65 pounds, even though sheet steel replaced 700 pounds of the light alloy



in one searchlight. Besides saving metal, many boring mills and other machines were freed for the production of much-needed weapons.

Most features of the new design are shown in the sketch. The reinforcing ribs are made with flanges for welding. They are spot-welded to the inner side of the arm before joining the two halves. Welding on the other

half of the arm can be done from the outside. The round center section is made in two parts, which are spot-welded together to form a boxed-in, ring-shaped channel and a rigid supporting member.

Does this example of alloy-saving design remind you of other opportunities? If your job calls for sheet steel, one of ARMCO's special-purpose metals can do the job for you. For more information write to The American Rolling Mill Company, 2691 Curtis St., Middletown, Ohio.



THE AMERICAN ROLLING MILL COMPANY

Fatigue Cracks

BY A. H. DIX

Ghost Speakers

••• Grand opera impresarios have been toying for years with the idea of having the big-busted contraltos and the bull-throated basses do their singing offstage, while more personable performers went through the motions onstage. Thus, eyes as well as ears would be pleased. A few, like Lily Pons and Risa Stevens, are qualified by nature to be seen as well as heard, but in most cases the functional physiques of the singers spoil the illusion except for those of the audience who are fortunate enough to be nearsighted.

Which leads us to suggest that public men lacking in oratorical gifts have their lines read by ghost speakers. Secretary of State Hull, for instance, is one who could do with a silver-tongued stand-in. This could be done without awkwardness. The Secretary himself could introduce his alter-voice, pleading a cold. The voice could deliver the address in such a way that listeners would be enabled to concentrate on what was being said instead of on the manner of saying it. The Secretary could deliver the closing remarks, and everybody would be happier.

Apronym

••• John E. DeKay is a Detroit mortician.
—Stanley S. Roe,
Automotive Council for War Production

Kindergarten Fugitive

••• E. A. Mahon, Montreal, sends in this clipping from the N. Y. Times' classified section:
5-YEAR-OLD metal manufacturer seeks investor,
\$25,000 additional capital, X 2655 Times Bldg.

Which reminds us of what Groucho Marx said to an individual who bragged that he had supported himself since he was 10 years old. "What were you before that," said Groucho, "a bum?"

Foul Ball

Who on earth told you that shadow factories were sub-contractors? They are nothing of the kind. Before the war most of the large aircraft factories created three or four more or less exact copies of their works in new and undisclosed locations—usually in the heart of the country.

—V. C. Faulkner, Editor,
Foundry Trade Journal, London

While we would like to take the blame ourself, a passion for truth and a cheerful willingness to pass the buck cause us to confess that when we asked your favorite family journal's managing editor, T. W. Lipert, "What is a shadow factory?" he pursed his lips, clasped his hands over his concave stomach and said, "A shadow factory is a sub-contractor."

We are not sorry that Mr. Faulkner has magnafluxed this surface crack in the brains department's omniscience. The priests who served the Delphic oracle must have prayed that a wrong answer would come out of the hat every now and then just to relieve the monotony.

Initial Blizzard

••• We would like to gripe about the way some publications overdo the naming of government bureaus and other organizations by initials only. WPB, OPA and NLRB are safe enough, but when ODT, DPC, SRC, FDIC, USES, and so on, are tossed at us without a key, we begin to flounder.

Maybe we ought to know what the letters stand for, but we don't. We don't even recall whether the A in NRA stood for Act, Authority, or Administration. Our current worry is AMGOT. We have a vague idea of what it means, but we wish that instead of flattering us by taking it for granted that we know, the news reporters would spell it out.

Blessings on those editors who insist that the first

reference to any organization, in any news item, be spelled in full. After clarity has been established, the space-saving initials can come along. We wonder what AMGOT does stand for?

Initial Test

••• Harry ("Hig") Higdon, who edits the Phoenix Metal Cap Company's famous house magazine, *Phoenix Flame*, sends us this poem about the alphabet bureaus, called "A-B-C Democracy":

Our alphabet's in armed array—
With SSS, FPDA
Drafted to shorten history—
CPRB and DPC.
Its letters like the infantry—
OLLA, OAPC
Lined up to spring into the fray—
WPB and OPA.
To give all for democracy—
OWI, BWC
And thus preserve our liberty—
IADB and OCD.
Abbreviate, abridge, condense,
If it will aid in an offense
Which PDQ the war will end,
So that we can a V append.

If you can identify more than five of the dozen bureaus mentioned you are beating par. The key:

Board; OCD, Office of Civilian Defense.
War Communications; IADB, Inter-American Defense
tion; OWI, Office of War Information; BWC, Board of
Production Board; OPA, Office of Price Administra-
OAPC, Office of Alien Property Custodian; WPB, War
Corp.; OLLA, Office of Lend-Lease Administration;
Production and Resources Board; DPC, Defense Plant
tion and Distribution Administration; CPRB, Combined
SSS, Selective Service System; FPDA, Food Produc-

Hotcakes

••• The brains department threw a blue chip into the postwar-aid jackpot when it published in the July 5 issue a list of enemy-owned patents now available to manufacturers of metal products. Any of the patents is yours upon payment of a small fee to the U. S. Alien Property Custodian.

Our supply of copies of the issue melted like an ice cube in an open hearth. So we were obliged to reprint the list. If you want a copy, send 15c. to us at 100 E. 42nd St., New York 17.

Tool Steel Directory

You might also like to know that the brains department has just put the finishing touches on a new edition of the directory of tool steels and other metal-cutting materials. It includes all the latest brands, specifies the composition, and gives name and address of the maker. Brands that have been discontinued are so marked.

The printer is now setting it in type and it ought to be ready within a couple of weeks—about 64 pages, pocket size. What we will have to charge for it to break even, we don't know yet. Probably 75c. or a dollar.

Inferiority Complex Cure

••• If you wonder, as we did, where the promoters of the groups that foster racial hatreds get their followers, you will find the answer on page 483 of the best-seller, "Under Cover." One of the more intelligent of the promoters says:

There are a lot of neurotics and frustrated people in the world. Old maids, missionary types, people who have to get a release for their hates, neglected people. They all want to become somebody by joining a movement.

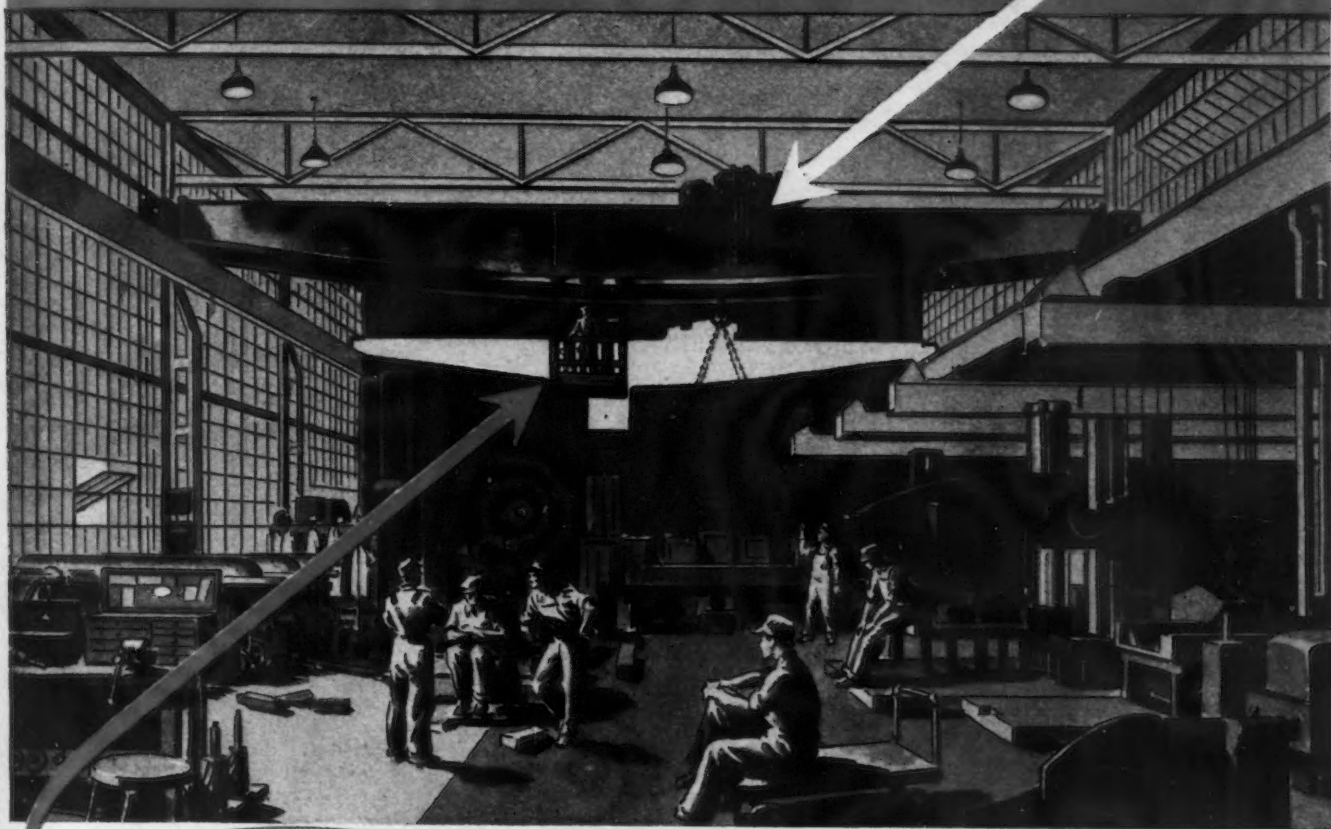
Puzzles

Last week's fast hand makes $8\frac{1}{2}$ revolutions.

W. P. Kelly says there may be more than one answer to this:

Use each number from 1 to 9 inclusive once and only once and have them add up to 1. Multiplication and subtraction not permitted.

WAITING FOR *THIS CRANE* LOSES LOTS OF MAN HOURS



AN EXTRA *Northern* CRANE Would Save Them

Maybe they wait only a few minutes—but if they do it many times a day, plenty of man hours are lost—and you pay for them.

Moreover, the whole production schedule is slowed—time is lost everywhere—costing money and impeding your part of the war effort.

An extra Northern Crane on the runway will save all these countless minutes now being lost. Also, if you

have an extra crane you need not fear breakdown—it won't tie up your shop.

Investigate the time saving possibilities of an extra crane.

Northern Cranes are fast, powerful, strong, have fine control. They are the fine machine tools of material handling.

Northern

ENGINEERING WORKS

General Office: 2607 Atwater St., DETROIT 7, MICH.

NORTHERN CRANE & HOIST WORKS Limited • WINDSOR, CANADA

OFFICES IN PRINCIPAL CITIES

Dear Editor:

MILLION-TON ERROR

Sir:

In your issue of Aug. 19, page 88, giving classifications of billings of steel products by consumers for 1942, we notice what appears to be a typographical error in the net total tons of black plate. This is shown as 1,491,433 tons whereas it apparently should be 491,468 tons, or 1,000,000 tons less.

G. W. KREER,
President

Lafayette Steel Corp.,
4130 W 42nd Place,
Chicago

● Mr. Kreer is right and we are wrong. The correct total is 491,468 net tons. A rebuke to our statistics checker for not detecting this error made by the American Iron & Steel Institute, from whose annual report the table was reproduced.—Ed.

LOST STEEL

Sir:

Recently I read an article in a trade journal that upheld the strike action of John L. Lewis and the U.M.W. In seeking to justify this action, the writer made the following assertions, which I find I cannot accept:

(1) "At the time of the strike there was on hand and in storage 79,000,000 tons of coal, the greatest on record and capable of filling four months' needs."

(2) "The closing down of furnaces (steel blast) was the customary one that takes place in order to make relining and major repairs possible. They would have been shut down anyway because of necessity, strike or no strike. The necessity came at a good time to hit Lewis and the U.M.W."

Are these the facts? Can you let me know what the coal reserve was, and if the effect of the stoppage is still felt?

HOWARD GLASSMAN

2153 Southern Blvd.,
Bronx, N. Y.

● Data in the hands of the W.P.B. reveal that 131,000 tons of steel ingots was lost because of the June coal strike. The June loss due to abnormal repairs and breakdowns was 148,000 tons. In July, some 80,000 tons of ingots was lost because of coal strikes. By August the situation was pretty well back to normal. We do not know whether the 79 million ton coal inventory figure is correct. In any event, it has little meaning, because only a small percentage of coal production is of coking coal variety, from which coke can be made. At the beginning of the coal strike, coking plants had approximately 2½ weeks' supply of coal on hand, and perhaps another week's supply in transit. Blast furnaces had practically no reserve of coke on hand. Therefore, the coal strike had an immediate and sizable effect on steel production.—Ed.

CUPOLA LOSS

Sir:

An item in your Sept. 2 "Dear Editor" page on cupola loss reads, "if considerable steel scrap were used with pig iron, the cupola yield would be close to 100 per cent, as the metal picks up silicon and carbon in quantities

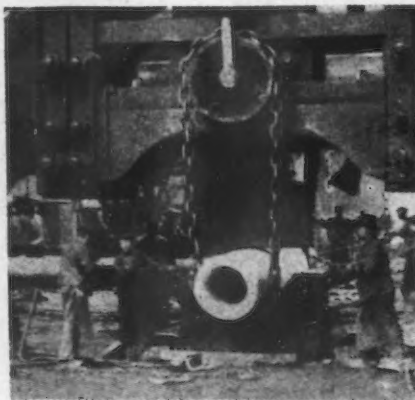
sufficient to balance oxidation loss."

From my experience, the average cupola loss is about 5 per cent, of which 2 to 3 per cent can be traced to metal spillage. However, my complaint is to the statement that on irons of normal silicon there is an average loss of about 10 to 15 per cent of the silicon content, and only very rarely even in irons of low silicon of .40 to .60 do you find sufficient reduction to pick up silicon from the silica of the refractory. So, in figuring all charges and metal losses, it is advisable to rely on a 10 to 15 per cent silicon oxidation.

A. J. EDGAR,
Technical Advisor

Gray Iron Founders' Society,
1341 Connecticut Ave., N.W.,
Washington 6, D. C.

BIGGEST CASTING



Sir:

"What is the weight of the heaviest casting ever made and where was it poured," is a question asked in your June 24 "Dear Editor" page. Harry Everett in your July 15 issue says the record was established in Perm, Russia, in 1873, where an anvil weighing 500 tons was cast.

The famous "Hammer Fritz" of the Krupp plant in Essen, built in 1861, had an anvil weighing 1000 tons. The hammer was dismantled in 1910 to be replaced by a hydraulic forging press. The anvil was cast in one block, and when dynamited was found to have been poured in four stages of 250 tons each, each layer being poured on the solidifying previous stage. It was made of first class hematite cast iron. The photograph shows the forging of a cannon barrel by "Hammer Fritz."

MAX STERN

New York

PIPE-SPINNING—GAY DIES

Sir:

A few months ago, you printed an article on a method for reducing or tapering steel tubing by a new spinning method. Could you tell me when this appeared?

A few days ago, we ran across the term "Gay Dies." Have you any data on this type of die?

G. B. OLSON,
Tool Section

General Electric Co.,
1285 Boston Ave.,
Bridgeport 2, Conn.

● Page 71 of the June 17 issue describes a method of making bomb casings by spinning sections of steel pipe. We have never heard of "Gay Dies."—Ed.

TOOL STEEL DIRECTORY

Sir:

I have recently come into possession of a booklet called, "Directory of Tool Steels and Other Metal Cutting Materials." Because this booklet is quite valuable to other men in our plant, we would appreciate your mailing us four copies, with bill.

JOHN SCHUL

Coleman Lamp & Stove Co.,
Wichita, Kans.

● We have no more copies left of the Tool Steel Directory, but a new edition is now in the hands of the printer, and should be ready in a few weeks.—Ed.

PLASTICS

Sir:

A reprint of the article, "Plastics and Plasticity," by E. V. Crane in the Aug. 26 issue of the undersigned's favorite magazine, will be greatly appreciated. The article is of great interest to me, and a copy for my notebook will be gratefully received.

B. G. ERIKSON,
Purchasing Agent

Signode Steel Strapping Co.,
2600 N. Western Ave.,
Chicago

Sir:

We have noted with much interest a series of articles in your recent issues on "Plastics and Plasticity." We suppose reprints would be available and would like to have two copies.

B. T. BONNOT,
President

Bonnot Co.,
Canton, Ohio

Sir:

We are much interested in the series, "Plastics and Plasticity," by Mr. Crane. If reprints are available, we would appreciate receiving at least one copy.

RUSSELL E. BARNARD
American Rolling Mill Co.,
Middletown, Ohio

● Reprints are being made. They may be obtained by applying direct to the author, E. V. Crane, E. W. Bliss Co., 53rd Street & Second Ave., Brooklyn, N. Y.—Ed.

HAND DE-BURRING SUBSTITUTE

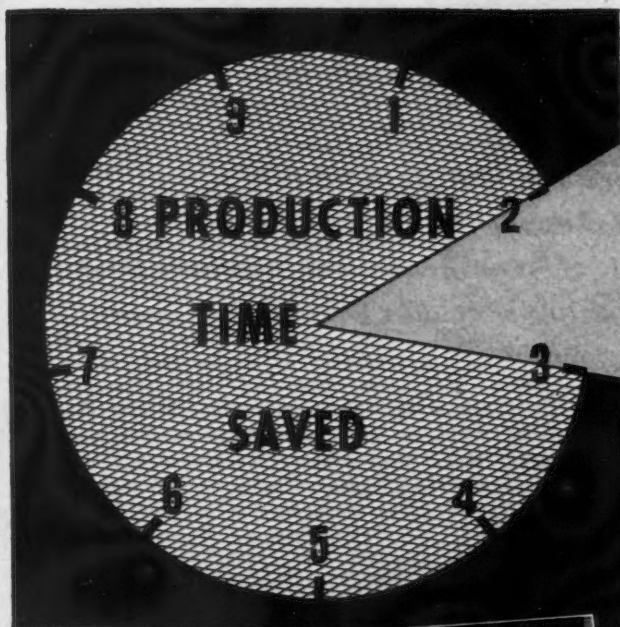
Sir:

Your Aug. 12 "News Front" mentions wet grinding as a substitute for hand de-burring. Can you give me any information as to machines or processes for this operation?

R. S. GOOD

Elliott Co.,
Jeannette, Pa.

● We suggest you write to Crown Rheostat & Supply Co., 1910 W. Maypole Ave., Chicago, Ill.—Ed.



Production Increased 800%

The height of the stack of eight wheels, in the lower picture, compared to the height of the one wheel, shows the *relative* increase in the number of these wheels finished per day, now and formerly. The operation consists of turning the outside diameter, from rim to rim. Formerly, this was done on standard lathes. By putting the job on Monarch-Keller lathes, with electric controls, production was increased 800%. By this method, a thin metal template is drawn over an electrically controlled tracer, and the cutting tool *automatically* follows the specified contour, thus permitting greatly increased speed and accuracy of production.

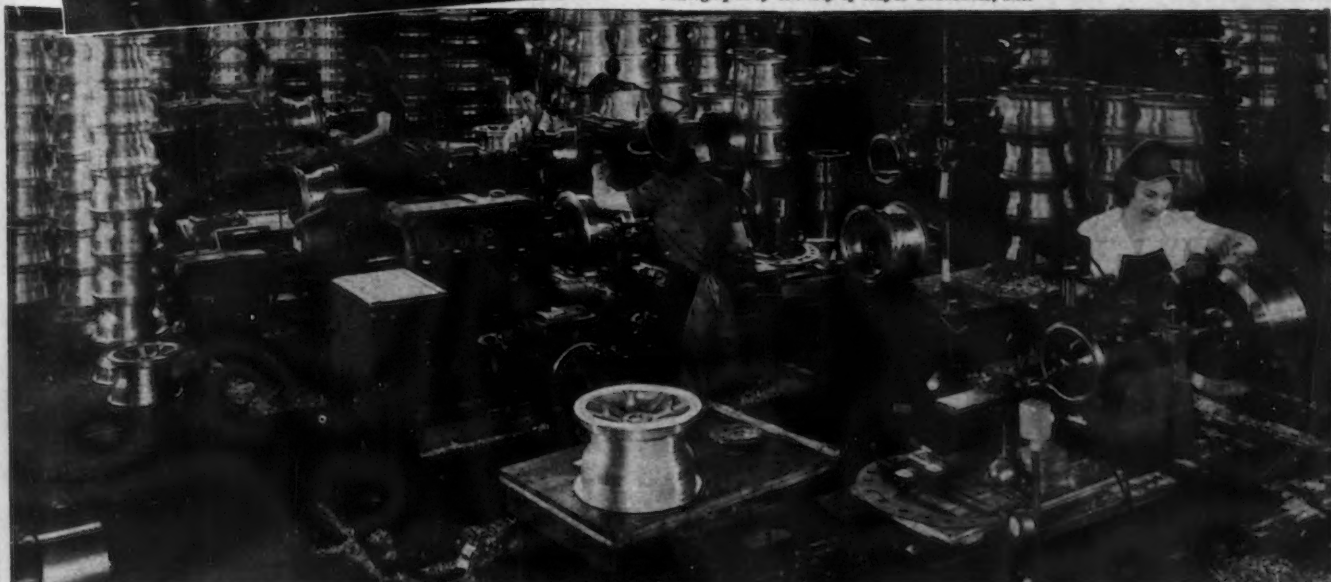
Monarch-Keller lathes are similarly increasing production of many and varied kinds of war work. If we can help you select the right tool for the right job, we'll gladly work with you.

THE MONARCH MACHINE TOOL CO. • • • SIDNEY • OHIO

MONARCH LATHES

Save Time

Photographs by courtesy of Hayes Industries, Inc.



This Industrial Week . . .

- **Pressure for Flat Rolled Steel Rises**
- **Baruch Report Highly Significant**
- **Output of War Equipment Remains High**
- **Steel Output Remains at 99.5 Per Cent**

THE President's promise that the Allies have set the dates for new blows in Europe and Asia is borne out by high activity among metals producers and users this week. For instance, steel production continues at the very high rate of 99.5 per cent.

Also, the President's words help explain, among other developments, the rush for steel plates and the consequent squeeze affecting other forms of steel. With plates constituting 20 per cent or more of total finished output, other steel products necessarily are restricted at blooming and slabbing mills.

By all odds, however, the Baruch report on the critical domestic manpower situation stands out as the most important document of the week. After pointing out the gaps and weaknesses which industrialists long have confronted in the present haphazard setup, the report urges priorities on labor and other moves, some similar to those advocated by the originators of the Buffalo hiring plan. In the opinion of certain experts, manpower wastage is the greatest evil today. Rectifying demands include a stop to labor hoarding (known and admitted privately by WMC), revisions freeing more of the military forces for active service, steps placing war contracts on a basis of manhour efficiency standards, and other moves to pep up labor utilization.

The week brought brighter prospects that Congress might enact a bill providing for substantial post-war reserves, despite military condemnation of allowing such reserves to come out of renegotiation or as deductions from taxes. A poll by THE IRON AGE of the powerful House Committee on Ways and Means, as well as inquiry among business interests who appeared before the committee, reveals that a majority of the members and business representatives think that the government should provide reserves in lieu of a WPA for industry after the war.

WITH output of war goods in full stride, changes in the program as the result of the invasion of Italy have not been noted yet, except for perhaps a strengthening of the amphibian truck program.

These invasion units accounted for themselves so well in Italy that production schedules are likely to be enlarged. A good proportion of the steel required will be in sheets and plates, which will complicate further the very tight situation prevailing in those products. Some orders for sheet steel were being returned to customers this week because of a new increase in the tonnage of plates which are to come off wide strip mills during the next six months. Plate mill schedules are so high now that there is no safety factor in the event of breakdowns, strikes or other unforeseen developments. Tin plate production for fourth quarter and possibly the first of next year will feel the effects of the expanded plate program. This week it appears November and December schedules for tin plate have been cut 10 per cent, indicating fourth quarter output of about 511,000 tons. First quarter production of 630,000 tons now is indicated, a decline from original estimates.

The steel industry is still suffering from sporadic strikes. This week there was a spontaneous walkout of 2000 members of the CIO which virtually halted operations of the tinning, 42-in. hot strip and cold reduction departments of the Gary sheet and tin mills of Carnegie-Illinois Steel Corp. Apparently the walkout followed the reassignment and laying off of 600 tin mill workers as a result of the WPB curtailment of fourth quarter production.

DESPITE the rather plentiful supply of electric furnace alloy steel, there has been no stampede by consumers to switch to its use. The differential of \$10 per ton above open hearth alloy steel (about 62 per cent of total alloy steel production is from open hearths) is one reason. The easing of demand has developed a tendency to reduce imports and inventories of critical materials for electric furnaces. Simultaneously with the drop in demand for alloy steel there is a stronger demand for carbon steel.

The steel expansion program seems to be moving toward its finish rather irregularly. Some of the new furnace capacity, and other units will be or already are available for operation ahead of the necessary equipment for handling and processing the steel. Somewhere between 80,000 and 90,000 tons of ingots per month are believed by some experts to represent a surplus for interchange. As mentioned previously, freight costs on these ingots have been a subject of much discussion.

WPB has announced a comprehensive program for the redistribution of huge amounts of idle or used equipment valued at \$1,000,000,000. This is only the initial flash-back from over-ordering in the haste to prepare for war, according to a WPB spokesman.

Another announcement of importance last week was the program to coordinate component part ship-

News Highlights in This Issue

Idle Tools Moved	68	Navy Would End	
Geneva Future Studied	85	Renegotiation Act. . . .	92
Electrolytic Quota	87	Machine Redistribution. . .	94
Illinois Coal Output.	87	Component Orders	
Plates Jam Schedules.	88	Blend	96
Alloy Forging Cycles.	89	CMP Developments. . . .	98
Post-War Reserve Hopes	90	Machine Tools	136
		Scrap Markets	140

ping schedules with end product manufacturing, included in General Scheduling Order M-293 as amended.

COMPLAINTS over the Controlled Materials Plan were negligible for a long time, but recently they have increased. The jam on sheets and other flat rolled products emphasizes that the plan is not in balance. Theoretically, steel is supposed to be available for all official allocations, but actually this is not the case. Steel buyers sometimes complain that their competitors get allocations for periods far more distant than they do, to which WPB replies that every buyer should make request for distant allocations.

Anticipating large tonnages of steel to be involved in redistribution as a result of contract terminations and cutbacks, OPA has ruled that idle or frozen materials should in the future be governed by Maximum Price Regulation No. 204. Incidentally, steel originally slated for France, Holland, Belgium and other countries still can be found over the nation.

Growing concern is felt over scrap supplies because shipments have dropped off in the past few months. Quotas for collections during the balance of this year cannot be met without a hard-driving realistic campaign, aimed particularly at industrial scrap. Among possible factors which may make the scrap situation even worse in coming months are the lag in ore shipments, and tight coal supplies.

STEEL ingot operations include a loss of one point to 101.5 per cent at Pittsburgh, offset partly by the gain of half a point to 99.5 per cent in the Chicago district and of one point to 97 per cent at Youngstown. Wheeling production is up two points to 102 per cent and Detroit ingot output is up four points to 101 per cent. Eastern district operations have also increased four points to 101.5 per cent. The only other decline this week occurred in the Cleveland area which

For the Record— War Output Summarized

• • • The United States now has the mightiest surface fleet in world history, according to a Navy Department report. Against the 1076 vessels of three years ago the Navy now has 14,072. Their combined tonnage is almost five million tons. We now have 613 warships compared with 383 three years ago and on July 31 there were 18,269 planes in the Naval air force.

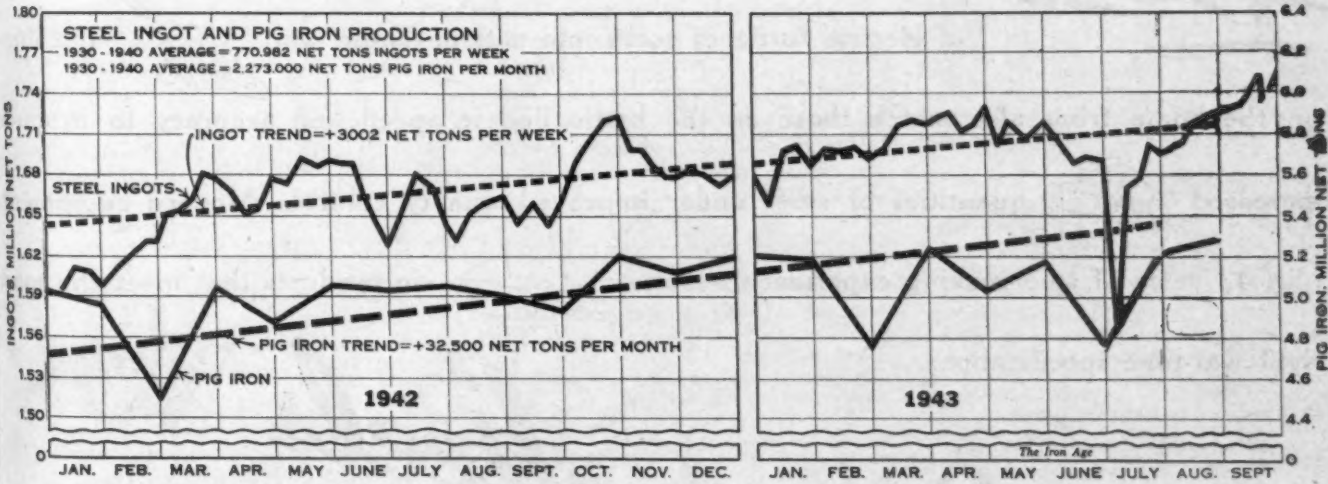
The President, in his message to Congress, reported that the total amount spent on the war from May, 1940, to date is \$128,123,000,000. We now are spending at the rate of \$250,000,000 per day. Up to Sept. 1 among the more important items delivered since May, 1940, were 123,000 airplanes, 349,000 airplane engines, 55,000 tanks, 93,000 artillery weapons, 9,500,000 small arms, 25,942,000,000 rounds of small arms ammunition and 1,233,000 trucks. In some instances more than half of the foregoing total was produced during the first eight months of 1943.

The completions of Navy ships during the last six months, according to the President, were equal to completions in the entire year of 1942. Since May, 1940, 13,000 landing vessels were built and 2380 fighting ships and auxiliaries of all kinds.

is down two points to 97.5 per cent. Unchanged from last week are Philadelphia at 93.5 per cent, Buffalo at 104.5, Birmingham at 102, Cincinnati at 105 and St. Louis at 106.5.

Pig iron production for August rose to 5,269,835 net tons from 4,972,334 tons the previous month, from 93.5 per cent of capacity in July to 98.0 per cent. Ferro-alloy production, however, fell to 45,798 tons from 50,411 tons made in July. Total tonnage made is highest since March when 5,247,792 tons of pig iron and 66,409 tons of ferro-alloys were turned out.

The Iron Age

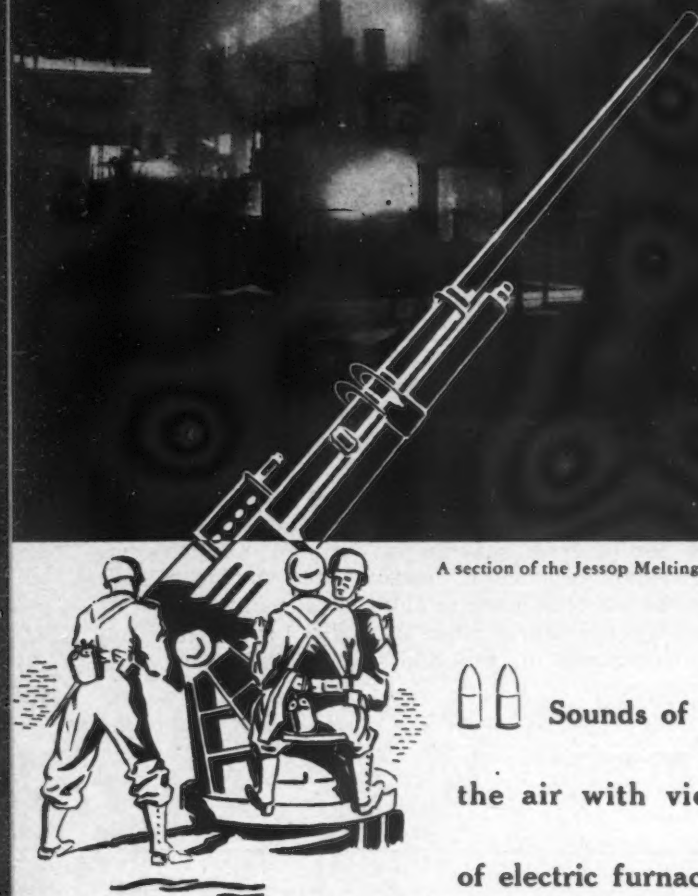


Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
September 16...	102.5	99.0	96.0	93.5	99.5	104.5	100.0	102.0	97.0*	95.0	105.0	106.5	97.5	99.5
September 23...	101.5	99.5	97.0	93.5	97.5	104.5	102.0	102.0	101.0	95.0	105.0	106.5	101.5	99.5


* Revised.

The FIRING LINE on the HOME FRONT




A section of the Jessop Melting Department. High frequency induction furnaces and other electric arc furnaces are not shown.




Sounds of battle-action—the crack of machine gun fire ripping the air with violence— are simulated as this battery of electric furnaces roars into action. These war machines



on the home front also match those on the battle line in speed and accuracy to produce

increased  quantities of steel under improved quality control. Modern equipment,

plus 42 years of steel-making experience, results  in products that meet the most

rigid war-time specifications.

Jessop Steels

HIGH SPEED • ALLOY
COMPOSITE AND CARBON TOOL STEELS
STAINLESS AND STAINLESS-CLAD STEELS
SHEETS • PLATES • BARS



Established 1901

JESSOP STEEL COMPANY

Head Office and Works

WASHINGTON, PENNSYLVANIA

Future of New Steel Plant In West Dependent Upon Period of Adjustment, Say Observers in Utah

Salt Lake City, Utah

• • • Steel market observers and researchers here have set considerable store on the new Geneva Steel Co. plant, especially as it is expected to affect future steel trends in the West. Refraining from undue optimism, and yet conceding that the whole Western iron and steel pattern can be changed rapidly after the war, J. R. Mahoney, director, Bureau of Economic and Business Research, University of Utah, and his associates, have delved deeply into the problem in a recent issue of *The Utah Economic and Business Review*.

Major points brought out in summarizing the effect of the Geneva and the Fontana steel plants are that while they are geared to supply more specific items to the West Coast shipbuilding industry, postwar changes and equipment, production and marketing, if made, could go a long way toward altering the West Coast iron and steel picture.

Says the report: "The Geneva Steel

A UTE INDIAN worker at the Geneva Works being built for the government by Columbia Steel Co., surveys the bastion of steel rising in the territory of his ancestors.



NEWS OF INDUSTRY

Plant has finishing mills for the production of plates and structural shapes needed for shipbuilding. This is a narrow range of finished rolling mill products when compared with the typical, large, integrated plant of similar size, and it leaves no provision for a wide range of steel needs, some of which are of special significance to the Western part of the United States. It would seem to be necessary that a number of other finishing units be added at a later date, to meet more adequately the major needs of Western steel consumers. This situation has arisen because the Geneva Plant was specially designed to meet the expanded shipbuilding demand on the Pacific Coast, which accounts for approximately 40 per cent of the total for the entire country."

The authors contend that the Geneva Plant has not been constructed without reference to more complete possible peacetime uses. It is said that the existing units have been so

designed and located as to permit subsequent construction of additional segments. Not only may the final pattern of the plant be complete, but the individual units can be established, it is said, in such relationship as to permit the most efficient operation.

The authors have indirectly pleaded a good case for the production of those products consumed in the West, and which during peacetime came

Total Ton-Miles to Assemble Raw Materials For One Ton of Pig Iron and Ship One Ton of Steel from Producing Centers to Pacific Coast

	Los Angeles	San Francisco	Portland	Seattle
Provo	1,382	1,495	1,572	1,743
Fontana	1,580	2,048	2,665	2,847
Pueblo	2,163	2,431	2,365	2,458
Birmingham ..	2,165	2,663	2,725	2,889
Gary	3,295	3,297	3,327	3,250
Pittsburgh	3,228	3,332	3,335	3,258

* Much of the distance over which the iron ore travels to both Gary and Pittsburgh is by water through the Great Lakes. In the table the water distances were adjusted to show equivalent rail distances on the ratio of 9.4 water miles for one rail mile. An adjustment was also made for Pittsburgh, 3.3 river miles for coal were figured as equal to one rail mile. Flux to Gary was corrected in the same way as the iron ore.

Reprinted from "Utah Economic & Business Review"

Comparative Assembly Costs for Materials to Produce One Ton of Pig Iron

Producing center	Iron ore	Coal	Flux	Total
Birmingham ..	\$1.25	\$1.64	\$.09	\$2.98
Gary	3.52	3.99	.26	7.77
Pittsburgh	5.88	.31	.37	6.56
Provo	2.87	2.16	.14	5.17
Pueblo	4.16	1.49	.43	6.08

THE IRON AGE, September 23, 1943—85

Ton-Miles Required to Assemble Raw Materials for One Ton of Pig Iron

Steel producing Centers	Iron ore	Coal	Flux	Total
Provo	452	173	10	635
Fontana	309	1,212	1	1,522
Pueblo	690	143	42	875
Birmingham ..	22	24	3	49
Gary	304*	723	10*	1,037
Pittsburgh	559*	24*	21	604

Reprinted from "Utah Economic & Business Review"

Comparative Analysis of Iron Ores

	Birmingham ore(1)	Mesabi ore(2)	Utah ore(3)
Iron	36.64	52.07	56
Silica	15.05	7.64	7
Alumina	3.15	....	1
Lime	15.09	....	4
Manganese	0.17	0.64	0.196
Phosphorus	0.33	0.06	0.2
Water	2.07	11.45	3

¹ Typical analysis of ore from Big Seam.

² Average analysis of all shipment from Mesabi Range for 1941. Includes 22.5 per cent concentrated ore.

³ Average composition as given by Leith and Harder.

Comparative Freight Rates on Selected Iron and Steel Commodities to the Pacific Coast

	Ingot, bil- Pig iron lets, blooms bars (gross ton)	Sheet (gross ton)
All-rail Rates:		
Provo, Utah.....	\$ 4.95	\$ 5.78
Pueblo, Colo.	7.70	19.04
Gary, Indiana.....	11.44	24.64
Birmingham, Ala..	13.70	26.66
Pittsburgh	15.41	28.45

Water Rates:

Sparrows Pt., Md..	\$10.20	\$10.20	\$10.20
Mobile, Ala.....	10.20	10.20	10.20

Reprinted from "Utah Economic & Business Review"

mostly from the East. It is indirectly recommended that provisions be made, subsequently, at the Geneva Plant, for hot rolled strip and cold rolled equipment. It is pointed out that because of the magnitude of the canning industry in the West a substantial market would exist for tin plate. At the same time, the Western consumption of pipe and tubular products is said to be such as to present an opportunity for production of these items, after the war, at the Geneva Plant. The various alterations suggested by the report would probably cost in excess of \$30,000,000, it is said, but "they seem to be necessary to permit the successful operation of the Geneva Plant under the conditions of a normal peacetime market."

Pointing to the need of more steel fabricating plants in the West, should the Geneva steel plant eventually bear

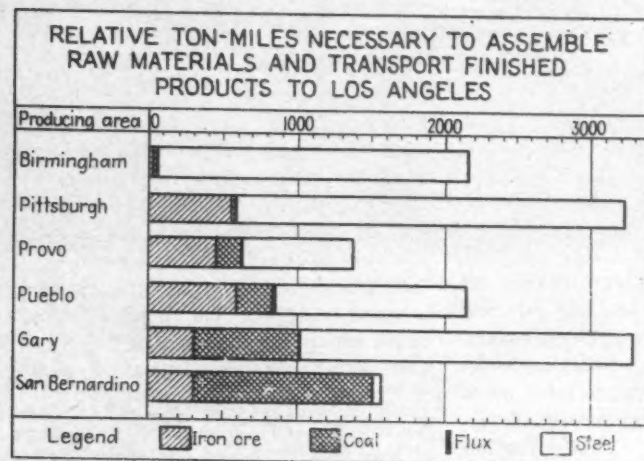
out the expectations of steel observers, the report states "the limited steel fabricating plants already developed in the West, have been based primarily upon the steel that has been produced by the rolling mills along the Pacific Coast. However, there are important exceptions to this generalization. Factories for the manufacture of tin cans from tin plate are already well developed in the Western part of the country. They have been operating on Eastern tin plate. They could shift to the same product, produced at the Geneva Plant, and probably will if this product is made available at a lower price than it can now be secured from Eastern producing centers after paying the cost of freight."

Pointing out that shipbuilding demands on the West Coast are running currently far in excess of what could be supplied by the Geneva and other

Western plants, it is argued that it is not likely for the postwar market to require more than an important fraction of the Western plate capacity. For most of the other steel products, however, it is said that fabricating plants in the West are not extensive enough to take care of the large rolling mill capacity.

Touching on the situation confronting the operators of the Geneva Plant (and, incidentally these operators are well aware of it) the study states "The Geneva Plant is one in which a period of time may elapse before the developing pattern of the iron and steel industry in the West will take that shape which will permit most successful operation. At the end of such period, when all the segments of the iron and steel industry in the West will have grown to their normal and logical stature, on the basis of the changed circumstances, there should be a more favorable basis for the successful operation of the Geneva Plant."

"It should be clear that the market for the rolling mill products of the Geneva Plant in the immediate postwar period may bear very little resemblance to the market as it may exist in a period sufficiently remote to permit the growth of that complement of fabricating plants that may logically be expected to develop under the changed steel situation in the West. This growth will take place if the prices for these Western steel products can be made as low as those near the Eastern rolling mill centers. This would afford to a fabricator with the Western plant an advantage approximately equal to the transportation rates that would have to be paid by an Eastern fabricator. In some cases, this may be sufficient to bring about a fairly early growth of new fabricating plants in fields where this factor will be especially significant. None of this development can be expected to take place until the postwar period."



Preprints from Utah Economic and Business Review

Cost of Materials Per Ton of Pig Iron

	Iron ore		Coke	Flux	Total
Birmingham					
(Value of ore at mine, 2.7 tons @ \$1.65).....	\$ 4.45	1.65 tons of coal @ \$2.28 (2350 lbs. of coke)	\$3.76		
Cost of assembly.....	1.25	Cost of assembly	1.64		
	\$ 5.70		\$5.40	\$.30	\$11.40
Gary					
(Value of ore at mine, 1.85 tons @ \$2.59).....	\$ 4.80	1.38 tons of coal @ \$2.03 (1900 lbs. of coke)	\$2.80		
Cost of assembly.....	3.52	Cost of assembly	3.99		
	\$ 8.32		\$6.79	\$.45	\$15.56
Pittsburgh					
(Value of ore at mine, 1.85 tons @ \$2.59).....	\$ 4.80	1.38 tons of coal @ \$2.01 (1900 lbs. of coke)	\$2.77		
Cost of assembly.....	5.88	Cost of assembly .....	.31		
	\$10.68		\$3.08	\$.45	\$14.21
Utah					
(Value of ore at mine, 1.85 tons @ \$1.00).....	\$ 1.85	1.60 tons of coal @ \$2.20 (1800 lbs. of coke)	\$3.52		
Cost of assembly.....	2.87	Cost of assembly	2.16		
	\$ 4.72		\$5.68	\$.45	\$10.85

Reprinted from "Utah Economic & Business Review"

A brief summary of the Geneva steel plant's annual capacities is as follows: By-product coke, 1,257,400 tons; pig iron, 1,150,000 net tons, which when added to the Ironton plant capacity, gives a combined total of 1,654,000 tons; open hearth steel, 1,200,000 tons; plates, 700,000 tons, and structurals, 200,000 tons. The plant also will have all necessary auxiliary equipment and machinery.

The authors feel that the availability and cost of iron ore in Utah, plus the cost of assembly, as well as the availability of coal, place the Geneva Plant in a relatively good light for pig iron costs when compared with Birmingham, Gary and Pittsburgh. Considerable attention is paid to the Utah iron ore deposits, which are approximately 250 miles from the Geneva blast furnaces. It is argued that considerable study could yet be made to determine the full reserves which would be available within 500 to 700 miles from the Geneva plant.

630,000 Tons Bottom Estimate of First Quarter Tinplate; Electrolytic Climbing

Pittsburgh

•••Subject to probable future changes, production of tin mill products in the first quarter of 1944 will amount to a minimum of 630,000 tons and a possible maximum of 650,000 tons.

January production may run 167,000 tons, with can makers insisting that 200,000 tons would more nearly approximate needs. February production is expected to be around 225,000 tons and March 225,000 tons. Preliminary

estimates on output for 1944 run from 2,600,000 tons to 2,700,000 tons, compared with a probable output this year of 2,500,000 tons.

Due to hold-ups in obtaining equipment, as well as the necessary time to make trial tests on can making, electrolytic tin plate output during the first six months of this year was slightly more than 10 per cent of total tin mill production. There is a possibility that during the last six months, electrolytic tin plate production may constitute close to 15 per cent. While

it is too early to estimate with any reliability, some observers believe that electrolytic production in 1944 may approximate 50 per cent of total tin mill production.

For the third time, fourth quarter tin mill product output has been revised downward. Originally set at 554,400 tons, it later was changed to 548,000 tons. Latest information indicates that fourth quarter tin mill production probably will be no more than 511,000 tons. A part of this loss is attributed to the cessation of operations at the Washington Tin Plate Co.'s plant.

These continual cuts in tin plate production make it extremely difficult for steel companies to insure the retention of skilled tin plate workers.

Production of tin plate as well as other tin mill products amounted to about 1,234,000 tons during the first six months in 1943. Distribution of shipments from tin plate mills during the first six months of 1943 was approximately as follows: hot dipped tin plate, 19,750,000 base boxes; electrolytic tin plate, 2,600,000 base boxes; black plate, 1,715,000 base boxes; pretreated or chemically bonded black plate, 1,005,000 base boxes; ternes, 1,330,000 base boxes; total 26,400,000 base boxes. (In order to convert to tonnage, base boxes can be divided by the figure 21.)

have supplies to meet more than immediate requirements. Thus, the nation's transportation systems might be the most seriously hit by any future work stoppage.

Illinois production rose from a pre-war average of from 40 to 45 million tons annually to somewhat over 60 million tons last year.

Illinois Coal Output Held Adequate; Tonnage Diverting, Strikes, May Affect

By CHARLES POST

Chicago Regional News Editor

Chicago

•••Despite dark hints that the nation's coal production is slipping, Illinois mines are expected to produce well over 70,000,000 tons this year, and can meet district requirements unless large tonnages continue to be diverted for export or to replace tonnages exported from other producing areas. This is the consensus of principal producers and suppliers and contains but one important "if"—continued production without work stoppage.

No responsible company or association official anticipates any prolonged work stoppage even if agreement between the mine operators, United Mine Workers and National Labor Board can not be achieved prior to the Oct. 31 deadline. All are carefully watching the current meeting in Washington of the UMW policy committee which, it is hoped, will come up with a mutually acceptable proposal.

A possible omen of the production responsibilities of this district was contained in a recent order by the Office of Solid Fuels Administration to ship 100,000 tons of locomotive fuel to the New York Central Railroad to replace tonnage which the railroad's normal eastern suppliers were ordered to ship to eastern lake ports for transshipment to eastern Canadian railroads. Hot on the heels of this major diversion came an order from the Solid Fuels Administration for emergency shipment of 17,000

tons per week to the Canadian Pacific Railway for transshipment from Chicago via lake during the remaining period of lake navigation, ending the latter part of November. This tonnage, expected to amount to about 187,000 tons, is to replace tonnage diverted from shipment to the Canadian Pacific by western Canadian mines. These Canadian shipments were diverted to fill the critical requirements of the far western United States.

Meanwhile stocks of major consumers in this district are spotty. Major utilities are estimated to have two or three months' inventory, but only one or two of the railroads are believed to

BRITAIN'S BOY MINERS: As part of a long range instructional program Britain is training school boys in coal cutting. As a result of volunteering for this work, boys may receive free education up to college degree.



Jam at Steel Plate Mills Accounts For Distribution Problems Elsewhere

Pittsburgh

• • • The increased tempo in the European war theatre, and the certainty of increased activity in the Pacific war front, preclude the slightest chance of any letup in the steel plate situation, for at least the next nine or ten months. The speed with which various plate rolling mills now under construction are completed will determine when the pressure for plates will be relieved.

Until the plate situation has become easier, there will be no possibil-

Barring unforeseen setbacks in shipping and on the war fronts, it appears that the plate picture will not change much before the end of the second quarter of 1944. The Kaiser plate mill at Fontana is now in operation, but like all new steel plants it will take a few months to reach maximum plate production. Brand new labor has been employed, and operational difficulties are bound to arise in the initial production phase.

Carnegie-Illinois Steel Corp.'s 160-in. plate mill at Homestead, Pa., is

ed sections, is the 120-in. Lukens Steel Co. plate mill at Coatesville, Pa. WPB at present is laying plans for making plate slabs available to the Lukens mill. This problem is extremely difficult, since practically all other steel companies are utilizing their slabbing capacity for their own plate mills. Among other projects which will add to plate production is the revamping of a plate mill at Granite City Steel Co., and a revamping of a 100-in. plate mill at Carnegie-Illinois' Homestead Works.

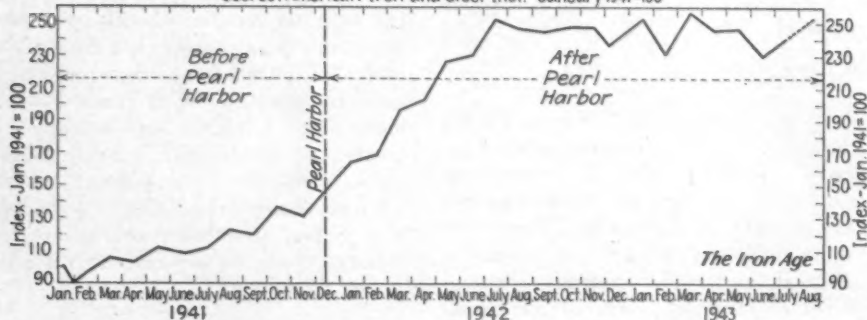
Probably no conversion project in the history of the steel industry stands out as prominently as the increase in plate production on large, continuous, wide strip mills. A heavy load has fallen upon these mills. This is brought home when it is realized that in January, 1941, total plate production amounted to 435,000 tons and was stepped up to 1,004,000 tons by June, 1942. By January, 1943, total plate production had reached 1,100,000 tons, and in March of this year the high point was reached when 1,128,000 tons of plates were produced—an increase of 160 per cent over January, 1941. Since March of this year, plate production has fluctuated from 1,000,000 tons to 1,100,000 tons a month.

The substantial production record for plates has, of course, been made at the expense of sheet production. So much so is this the case, that more than 150,000 tons of sheet orders have not found a "home" yet for fourth quarter production. Plate schedules set up recently for continuous mills are so high that any unforeseen breakdown, coal strike, or extreme manpower shortage, would immediately affect the attainment of the goal.

For these reasons, it seems idle to talk, yet, of the possibility for large-scale steel distribution to the OCR.

WAR TRENDS IN STEEL PLATE PRODUCTION
1941-1943

Source: American Iron and Steel Inst.—January 1941=100



ity that essential civilian requirements will be filled to any greater extent than to maintain the present home front economy. During the third and fourth quarters, there will be a disposition to release as much steel as possible for repair and maintenance, especially to the transportation industry including trucks and railroads, to the oil industry, and to other essential civilian activities. There seems no possibility that the less essential civilian concerns will receive steel in quantities which would allow even a semblance of return to normal, peacetime, manufacture.

Not generally understood by many steel consumers is the fact that as long as plates continue to constitute 20 per cent or more of total finished steel output, other steel products will be restricted by the availability of blooming mill and slabbing mill capacity. When the distribution of plates is stepped up, as it has been recently, this increment must come out of other steel products. Until such time as additional plate mill capacity is brought into normal operation, this situation will prevail.

expected to be in operation by the second quarter of 1944, providing present plans hold. The Geneva Steel Co. plate mill at Geneva, Utah, is expected to be rolling plates sometime during the second quarter of 1944, although the manpower situation at that plant will present an extremely difficult problem.

Another large plate mill, which possibly will be producing heavy flat roll-

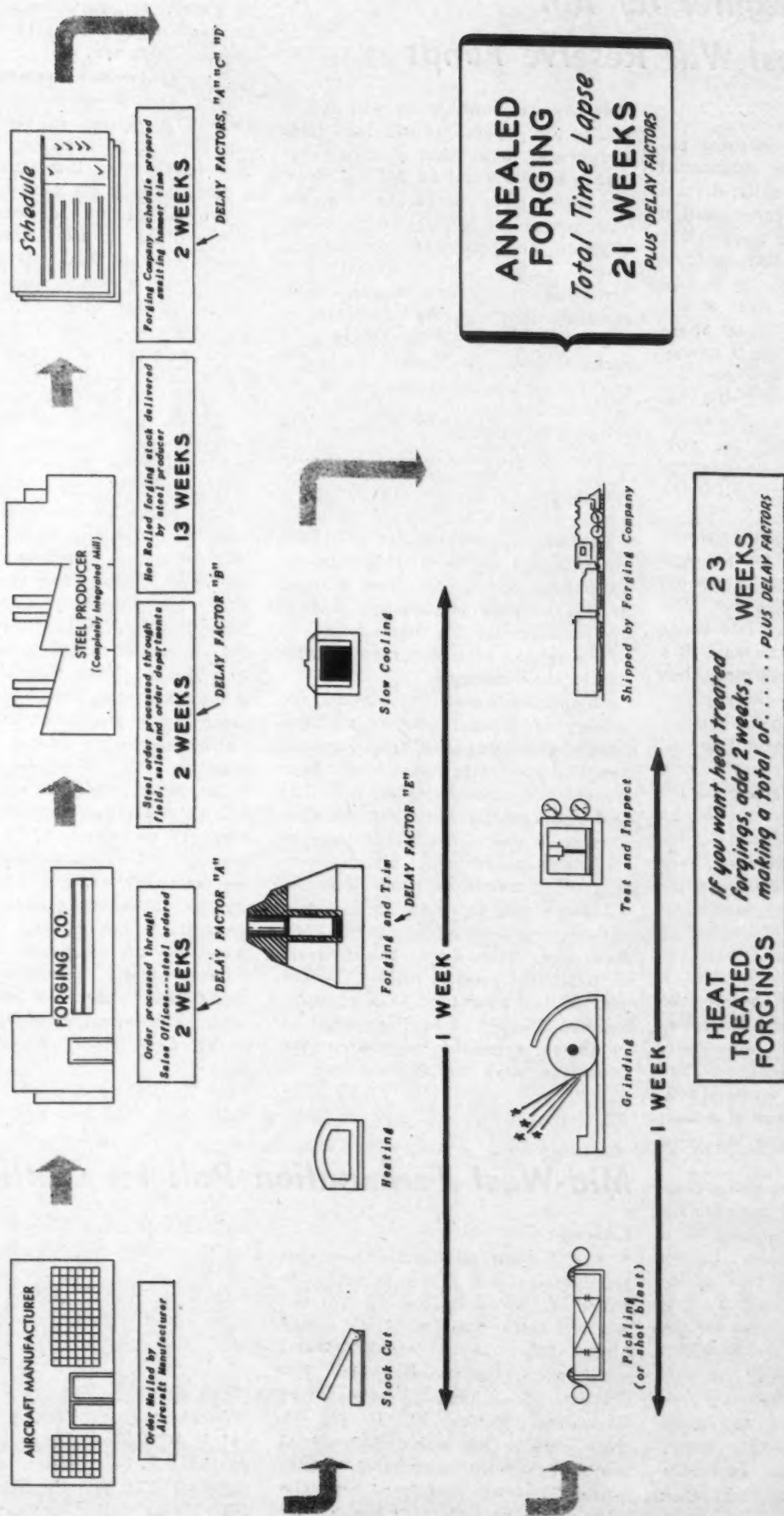
Labor Shortage May Stop Cleveland War Contracts

Cleveland

• • • Faced with increased production quotas and an ever-decreasing labor supply, Cleveland is expected to go into the Group I Critical Labor Shortage classification of the War Manpower Commission before long. This would automatically shut off to the city all new war production contracts and would prevent the renewal of many others as present contracts are completed or expire.

In a letter to the heads of all war plants in the area, the Chamber of Commerce urged that the forecasts of future labor needs be revised sharply downward to avoid a reclassification of the city. A practical approach suggested in the letter was for the labor procurement agencies and prime contractors to regulate the various types of contracts to Cleveland industries so that the hardest pressed industries would not be loaded too far in excess of the area's actual or potential labor supply. Bulk of the help needed is in unskilled lines.

TIME CYCLE FOR PROCUREMENT OF TYPICAL AIRCRAFT ALLOY STEEL DROP FORGINGS



DELAY FACTORS

- A-Engineering or Metallurgical Changes
- B-Steel mill cannot schedule order
- C-Die blocks not ready
- D-Cannot schedule... backing of orders
- E-Hammer or die breakage
- PLUS
- Delays arising from restrictions and rejections at any point

Prepared by
Materials Distribution Branch
Resources Control Section
Wright Field
Dayton, Ohio
August 19, 1943

21 WEEKS FOR ANNEALED AIRCRAFT FORGINGS: Here's another time cycle chart prepared by the Materials Distribution Branch, Resources Control Section, Wright Field, seeking to forestall shortages by having manufacturers take into consideration time cycles and delay factors when placing their orders for aircraft alloy steel drop forgings.

Hopes Are Brighter for Bill Permitting Post-War Reserve Funds

Washington

• • • The prospects of Congress enacting a bill providing for substantial post-war reserves grow daily, despite Army and Navy official condemnation of allowing such reserves to come out of renegotiation or as deductions from taxes.

A poll by THE IRON AGE of the powerful House Committee on Ways and Means, as well as inquiry among business interests who appeared before the Committee, reveals that a majority of the members and business representatives think that the government should provide reserves in lieu of a WPA for industry after the war.

The favorite proposal of the present rising tide of sentiment for reserves takes the form of allowing 15 per cent of taxable income for this end. The money would be converted into bonds to mature serially after the war. If a manufacturer fails to convert, then his bond credit would be cancelled.

Other major changes in the renegotiation law, which the Committee will likely recommend are: court review of the findings of renegotiation boards, the allowance of deductions in the same manner as provided by Internal Revenue Law, either the publication of renegotiation results without mentioning company names, or the deposit of written findings, and the design of a formula to govern renegotiation methods.

Witness after witness before the Committee testified that the Price Adjustment Board's methods were coercive. J. F. Lincoln, president of the Lincoln Electric Co. of Cleveland told the Committee that he knew of a case, although he did not name the company.

Said Mr. Lincoln, "Here was a company that had done an outstanding job of production renegotiated to a point where they say, and even I think their judgment ought to be sound—they say they are in trouble, in danger of disappearance, or at least in any case they are in a position where they will not be able to do the kind of job they would otherwise.

"When the assessment was made they said, 'Let us take this money and put it in escrow and go to the courts with it and see how much money we should pay.'

"The answer of the Undersecretary of War was this: 'You will agree to

that payment now, or we will expose you in the papers; we will hold from you every dollar that your government owes you, and we will not allow any Government contract to be placed with you unless you are so far below anybody else we can do nothing else.'"

Representatives of companies have reported that the War Department has told them that the signing of a renegotiation agreement precludes any future review of the matter in the courts. Committee members have resolved to change this situation.

A story on renegotiation in the machine tool industry appears on page 136.

Committee members say that the allowance of different deductions in computing taxes than those allowed in renegotiation is obviously unfair, and consequently this course is sure to be the subject of strong recommendation by the Committee.

Companies have objected to the secrecy of renegotiation which they contend precludes them from knowing how other competitors have been treated. Committee members hold that uniformity of treatment by the government is one of the cornerstones of republican government. Hence, there is a good chance that this difficulty will be overcome.

Representatives of the Army and Navy have claimed that the interests of flexibility require that Congress pass up the enactment of a formula, but Rep. Wesley Disney, Democrat of Oklahoma, a ranking member of the Committee says that it would not be

any more difficult to devise a formula to govern renegotiation than it was for the Congress to make one for the excess profits tax.

More or less in agreement with Mr. Disney were Representatives Aime J. Forand, Democrat of Rhode Island, and Richard M. Simpson, Republican of Pennsylvania. Indications are that a formula will get heavy consideration by committee members.

When the House Naval Affairs Committee met this week it was presented with a canned report based on the renegotiation hearings held by the Committee in June. The report already printed, and approved by the Committee's Chairman Carl Vinson, Democrat of Georgia was prepared under the direction of the Committee's General Counsel, Robert E. Kline, Jr.

From a reliable Congressional source it was learned that a different report may be adopted by a majority of the Committee, inasmuch as some members contend that the report is filled with innuendo unfavorable to industry. The Naval Affairs Committee is conceded to have done the Ways and Means Committee a favor by holding hearings, although the latter Committee is the proper one for originating legislation dealing with renegotiation.

The more important of the Naval Affairs report recommendations follow: (1) no repeal of the renegotiation act; (2) no blanket exemption of contracts for "standard commercial articles" from renegotiation; (3) renegotiation before and not after taxes; (4) the allowance of post-war reserves under termination agreements (not under the renegotiation law). These recommendations were predicted in THE IRON AGE, July 22, page 76.

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Mid-West Termination Policies Outlined

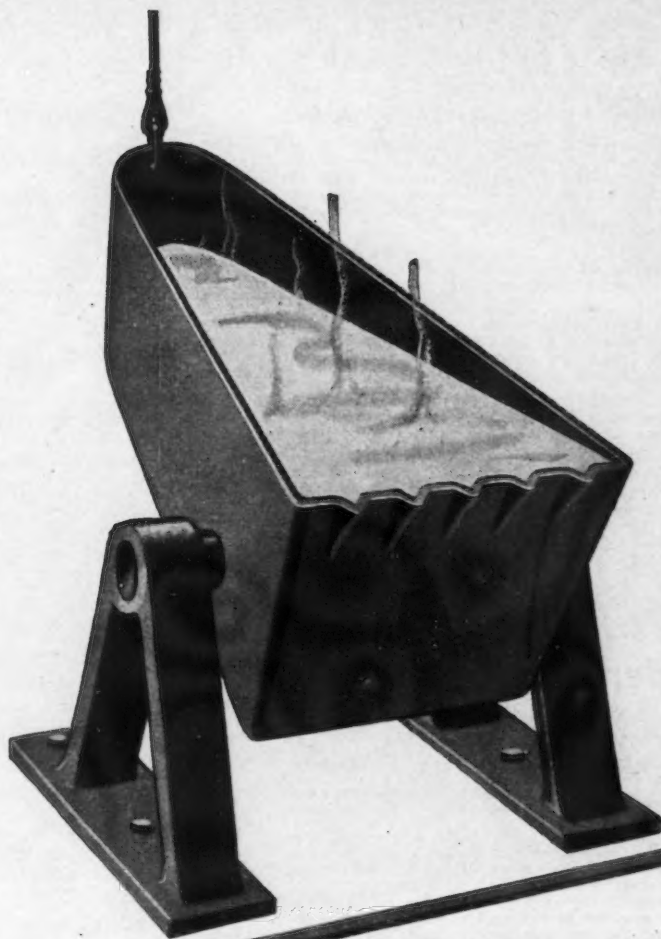
Chicago

• • • Volume of ordnance contract terminations will increase with the tempo of the war in order to furnish new and better weapons to the armed forces, Brig. Gen. Thomas S. Hammond, chief, Chicago Ordnance District, told the Chicago Association of Commerce last week.

He stated that negotiated settlements providing reasonable settlements for work performed could be made within three to nine months following termination, compared to two and a half to five years required to

make World War I contract settlements when contractors collected an average of 13c. on the dollar. He pointed out that negotiated settlements could be made on a compromise basis and providing a fair profit usually without the necessity of a detailed audit.

Speaking on the same program, Lt. Col. F. W. Parker, Jr., assistant chief, Purchasing, Termination and Renegotiation Policy for the District, confirmed that policy supported partial payments as soon as possible following termination and that responsi-



THE "COPPER BAR" CASE

—and how Hele-Shaw Fluid Power Engineers Solved it

In a certain copper refinery, whose name you would instantly recognize, they were having trouble. Continuous pouring of copper bars was yielding more than an allowable percentage of rejects. The guilt was traced to an electrical device tilting the ladle. The device, it was found, was jerking and jarring the ladle and shimmying the flow of metal.

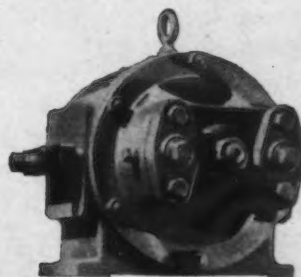
They had a hunch Fluid Power could help them, so they called in our engineers.

Hele-Shaw engineers studied the "case" and recommended a hydraulically operated lift for the ladle, powered by a special hand-lever controlled

reversible Hele-Shaw pump. That was in 1935. Thereafter, the ladle tilted and poured with the satin smoothness characteristic of Fluid Power. The device and the Hele-Shaw pump have been on duty ever since. Other metal refineries, in fact, eagerly duplicated it.

Yours may be an entirely different reason for looking into Fluid Power—but with equal opportunities for success. If you have a notion Fluid Power may improve a product or process, or simplify the control or operation of a machine in your post war planning, ask Hele-Shaw engineers to tackle the job.

THE
Hele-Shaw
Fluid Power Pump



OTHER A-E-CO PRODUCTS: TAYLOR STOKERS,
MARINE DECK AUXILIARIES, LO-HED HOISTS

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE • PHILADELPHIA, PA.

THE IRON AGE, September 23, 1943—91

bility for making settlement with suppliers below the rank of subcontractors, lay with the prime contractors and subcontractors. He emphasized that there could be no reimbursement for pre-contract expense, or amortization of capital investment in a greater amount than if the contract were completed.

Principles of the Chicago Ordnance District, which is the country's largest, were laid down by Henry P. Isham, chief, purchasing, Termination and Renegotiation Policy, who hinted that this district might well be a bellwether for the entire Ordnance Department and the ASF. Principles

outlined by Mr. Isham in a question and answer session included:

1. The Ordnance Department will not police or hold contractors responsible for meeting inventory requirements stipulated under CMP.
2. Contracts terminated by default will be handled under the mandatory clause covering default in the particular contract.
3. Even though the contractors' operations show a loss at time of termination, profit may be paid on work performed with certain provisions.
4. Recognition of reconversion expense in making negotiated termination settlements is doubtful.
5. The usual contract provision that government-owned facilities must be maintained in stand-by condition up to one year after termination is not now interpreted as meaning that equipment must be kept in place; the time requirement may be dropped to 90 days.

6. The contractor has his choice of including or excluding all receipts and expenditures under a cancelled contract from over all renegotiation.

7. Commissions paid to salesmen on cancelled contracts will be recognized as legitimate costs if paid, and reasonable.

8. Under the option clause the procedure emphasizes speed versus meticulousness and accuracy. Negotiators are specifically freed from the necessity of reconciling their recommendations with the audit report, if any.

9. Suppliers to prime contractors do not lose their right to enforce collection of their account upon agreed terms even though settlement with the government has not yet been made by the prime contractor.

10. A V-loan has no bearing on the settlement of cancelled contracts.

11. The government does not propose to purchase supplies turned back to suppliers by prime contractors in order to prevent market demoralization.

Renegotiation OK'd; Amendments Asked

Cincinnati

• • • Coming out boldly for renegotiation of war contracts but at the same time claiming the need for certain amendments to the act as it now stands, Victor H. Stempf, vice-president of the American Institute of Accounts speaking before the Ohio Society of Certified Public Accountants proposed a four-part revision.

In objection, Mr. Stempf said (the Price Adjustment Boards' powers) "... combined in one fold the legislative, administrative and judicial powers governing the determination of excess profits, and thereby control the fate of American industry and

the post-war destiny of our American economy."

The renegotiation act should be amended, he declared, along the following lines:

- 1.—To provide appeal to the courts against unjust decisions of the Price Adjustment Boards.
- 2.—To clearly provide for recognition of special amortization pursuant to certificates of necessity, and for subsequent reopening and redetermination of contract price adjustments when the period of the war has been fixed.
- 3.—To provide for reopening in respect of the impact of additional assessments of Federal taxes and other revisions of annual income, such as those relating to Section 722 of the Internal Revenue Code—in fact, the Section 722 principle should be specifically recognized in renegotiation.
- 4.—To recognize, above all, appropriate reserves for post-war costs related to and induced by operations during the war years.

on war contractors would "add fuel to the fires of inflation."

The Naval affairs committee report was made by Representative Maas, Republican, of Minnesota, and other committee members, taking a position contrary to that of Secretary Patterson and Chairman Vinson, whose report reflected Administration views, recommended that excess profits be raised to 98 per cent after allowance has been made for post-war reserves. The alternate report will be considered at a committee meeting next Monday.

Lukens Official Resigns From WPB Steel Division

Washington

• • • Arthur J. O'Leary, Lukens Steel Co. assistant general manager of sales resigned from the WPB Steel Division last week. Mr. O'Leary's resignation was at his physician's insistence, Steel Division director John T. Whiting said.

Naval Group Would End Act Jan. 1

Washington

• • • Turning thumbs down on a report made by Chairman Vinson which recommended extension of the act and government financing of plants in reconversion to peacetime production, the House Committee on Naval Affairs on Tuesday submitted an alternate report recommending that the War Renegotiation Act be terminated on Jan. 1. Giving further evidence of a Congressional trend, the committee recommended an amendment to the tax law to provide contractor with an "adequate" post-war reserve to finance reconversion. This sentiment toward permitting post-war reserves, as shown by an IRON AGE poll, prevails among members of the House Committee on Ways and Means, which is holding hearings on the Renegotiation Act. Repeal of the act was opposed by

Undersecretary of War Patterson in testimony on Monday. At the same time he declared that higher taxes

POST-WAR TRANSPORTATION: Helicopters for civilians ranging in price from \$1,500 to \$3,500, like the model held by Robert P. McCulloch, will be made in a plant to be erected near Milwaukee after the war.





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WPB to Redistribute Huge Total of Idle Machines and Other Equipment

Washington

• • • WPB last Thursday announced a comprehensive program for the redistribution of approximately 10,000,000 pieces of idle or used equipment valued at \$1,000,000,000. This is only the initial flare-back of over-ordering in the haste to prepare for war, a WPB spokesman says.

The program, which will follow similar efforts by various branches of the armed services is expected to hold down the post-war problem of liquidation and absorption. WPB regional offices will conduct the decentralized operation.

An innovation will be negotiated sales, under OPA price regulations. Such sales will be made to ultimate users certified by WPB as eligible purchasers.

Redistribution officials point out that the entire program is built around normal business methods. Its purpose, they say, is to provide assistance to those needing equipment immediately and at the same time to conserve the material, manpower, and facilities which would be required to fill these needs.

The Salvage and Redistribution Branch of the Ordnance Department, its counterpart in the Navy which is now being organized, Treasury Procurement, and other agencies forward their lists of excess or idle machinery to the various WPB Regional field offices.

Since there are more than 55,000 types of machinery available, there should not be any difficulty in securing the type desired, redistribution officials point out.

Whenever the files of the Regional Office do not show equipment as being available, the Redistribution Division will send out "want lists" to other regional offices and to dealers. The prospective purchaser receives a list of possible sources from which the item can be obtained.

The price of used equipment and machinery is largely governed by OPA Maximum Price Regulation No. 136 which establishes a price of 55 per cent for "as is" equipment and 85 per cent for rebuilt and guaranteed equipment. An alternative method of pricing is also provided. This is based on age and a fixed rate of depreciation.

A rating is not required to purchase most equipment, as there are few limitation orders controlling the purchase of used equipment. However, in some cases there are a number of items which are under limitation orders which require specific authorization.

The question of whether a manufacturer must accept used equipment will be resolved soon when WPB expands the use of a mandatory clause requiring certification that no used equipment is available before approval of application for new equipment can be granted. This clause already applies

Navy Pleads for Loan Of Workers in Ohio

Cleveland

• • • The Naval Procurement Section here is appealing to industrial plants in this area to yield to the Navy sufficient skilled help that will enable the completion of ships which are now on the ways in Cleveland and Lorain yards, before cold weather sets in. Machinists and electricians especially are desired. If advisable, the men will be returned after two months, according to Capt. R. P. Schlachbach who appealed to THE IRON AGE for assistance.

to all applications made on PD-1A, PD-3A and PD-4X, and applications in the P-19-h series.

The most critical machine tools cannot be secured through the Regional Offices. Application for them must be made either to the Tools Division or to the Industrial Facility Committee.

Anyone directly or indirectly connected with the war effort can obtain authority to purchase tools and equipment declared surplus by the Army. Before the WPB Regional Offices get lists of the equipment, negotiations can be carried on with field offices of the Army, including arsenals, depots and powder plants. Every list of tools furnished by the Army shows with whom negotiations may be conducted in the purchase of equipment from these lists.

Machine tools and other equipment owned by NYA, construction machinery, axes, shovels and other material owned by WPA and CCC, is being sold.

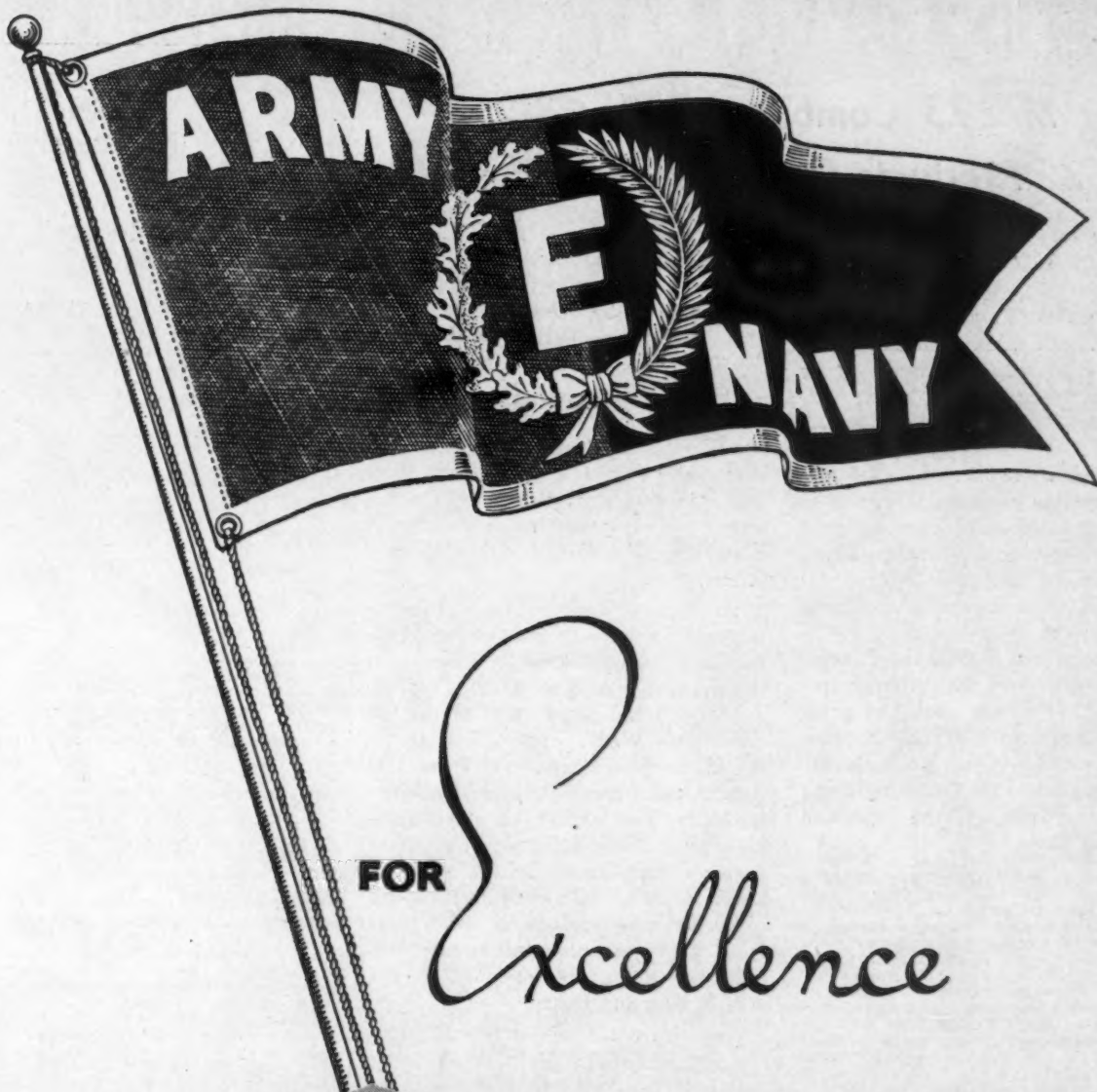
NAVY'S NEWEST: Sliding off the ways at the Pittsburgh yards of the Dravo Corp., is the U.S.S. Jenks, first of the new type destroyer-escorts. The vessel will travel down the Ohio and Mississippi rivers. It was named after Lt. (jg) H. P. Jenks of White Plains, N. Y., who lost his life in the Solomons last November.



Colorado Fuel & Iron Nets \$1,351,529 During Fiscal Year

• • • Shipments of steel products by the Colorado Fuel & Iron Corp. totaled 845,360 net tons for the fiscal year ending June 30, 1943, against 831,208 net tons in the preceding fiscal year. Steel operations averaged 101 per cent.

Consolidated net income for the year was \$1,351,529 after all charges, including \$1,960,344 provision for depreciation, depletion and amortization and \$1,236,000 for income and excess profits taxes. Net income was equal to \$2.40 per share. During the fiscal year a total of \$6,926,798 was spent in the extension and modernization of properties. The average number of employees was 10,944.



FOR

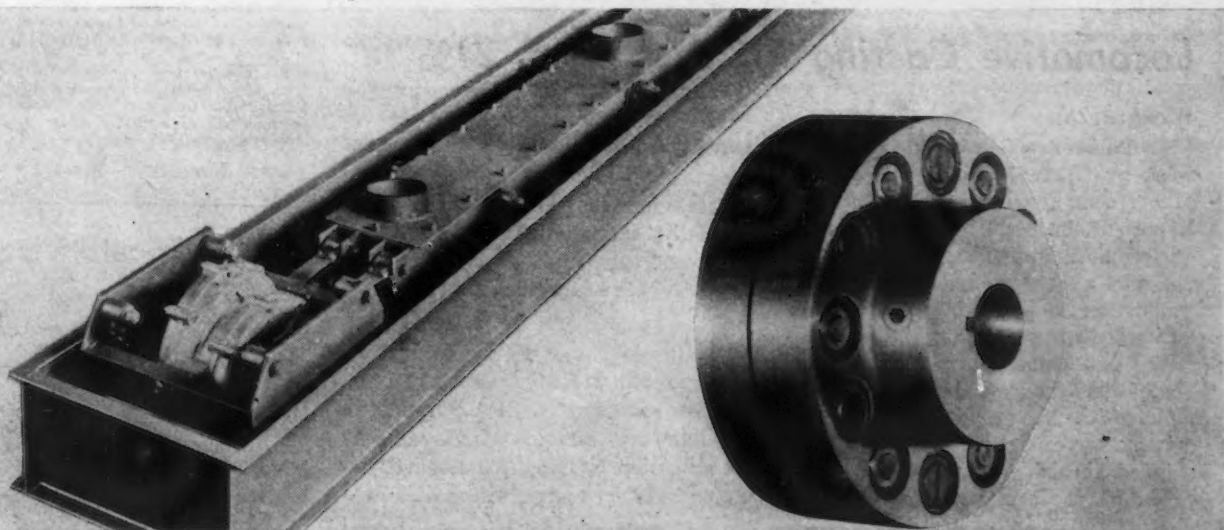
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Order M-293 Combined with CSP; New "Z" Products Go on Frozen Schedules

Washington

•••A program to coordinate component part shipping schedules with end product manufacturing schedules is included in General Scheduling Order M-293, as amended Sept. 17 by WPB.

This action, as stated in last week's IRON AGE, is taken by writing the provisions of the Component Scheduling Procedure—the program designed to schedule production of certain types of power components—into the order and placing its operation on a mandatory basis. The amended order becomes effective Sept. 24.

The Component Scheduling Procedure has been included through the designation of a new group of products under the order—Class Z products. Orders for these products are affected only when the following items are programmed by the specified claimant agencies:

1. Ships as programmed by the Navy Department, the Maritime Commission and the War Department
2. Advanced and Overseas Bases as programmed by the Navy Department
3. Tanks, combat vehicles, and motor transport vehicles as programmed by the War Department
4. Power generating plants as programmed by the Office of War Utilities
5. Plants designed for the production of rubber as programmed by the Office of the Rubber Director
6. Plants designed for the production of high octane gasoline as programmed by the Petroleum Administrator for war.

Any prime contractor or manufacturer must, when so instructed by the claimant agency, identify his purchase orders for Class Z products by filing specified form. This form will identify the orders by program and by their use and will show shipping schedules

in harmony with the schedule of the programmed end product or project. No one other than a claimant agency may initiate the use of the form and then only in connection with orders for Z products for the above listed programs.

The form may include a list of components of the products which are themselves Class Z products. If it does, the manufacturer, when placing orders for any of these components must in turn accompany them with a similar form.

Purchase orders for Class Z products do not become part of a manufacturer's frozen schedule unless (1) the product is also an X or a Y product, or (2) the person who places the order gets WPB's approval of freezing his supplier's schedule. When this is done and when the supplier accepts the order and agrees to make shipment on the date specified, it then becomes a part of his frozen schedule which he must follow without regard to preference ratings or directions from any governmental agency except that it may be amended by the War Production Board.

The freezing of manufacturers' shipping schedules for Class X products and the approving of purchase orders for Class Y products remain virtually the same as they were before the order was amended.

By virtue of the amendment, Order M-293 becomes the overall scheduling order for the products which it affects. Scheduling provisions of other orders relating to products covered by the amended M-293, are superseded.

Locomotive Casting Prices Upped 21%

Washington

•••Announcement was made last week by OPA of a price increase of 21 per cent above the Comprehensive Report of the Steel Founders' Society on locomotive steel castings to make possible a sharp expansion in their production so as to insure 4000 new locomotives in 1944 for military, Lend-Lease and domestic needs. It is reported that the great bulk of the locomotives to be produced under this greatly expanded program will be shipped abroad.

The 21 per cent price increase applies to all locomotive steel castings,

with the exception of main frames, superheater headers, gears and gear cases. OPA denied requests for increases in the ceilings for railroad speciality castings, with the exception of two items on which limited increases were authorized.

The changes will be authorized in Amendment No. 8 to Revised Price Schedule No. 41 (Steel Castings), and will become effective late this month. Pending the issuance of the amendment, Order No. 19, as amended, remains in effect and permits adjustable pricing.

Priority Changes

L-79—Amended order frees heating system controls from the order. (9-13-43)

L-123—Amend. I extends from Sept. 1 to Dec. 1 the exemption from rating restrictions for items of general industrial equipment frequently used on farms. (9-17-43)

L-128—Amended order restricts the use of chromium and nickel in automotive intake and exhaust valves. (9-18-43)

L-165—Order revoked.

L-193—Amended order permits "upstream sales" of unused conveying machinery and mechanical power transmission equipment without ratings. (9-16-43)

L-227—Amended order provides that pen nibs may not be manufactured to fill special orders except upon WPB authorization. (9-15-43)

L-236—Sched. II specifies permitted sizes, types and grades of marine joiner hardware, and materials that may be used in its manufacture. (8-28-43)

L-252—Amended order relieves producers of valves for use as part of the equipment of aircraft or watercraft other than pleasure craft of requirement of having firm orders as a prerequisite for making such valves. (9-18-43)

L-278—Amended order removes the prerequisite of having firm orders on hand in order to exclude from WPB restrictions those pipe fittings for use on aircraft or watercraft; for conducting dangerous liquids or gases, and for replacement purposes. (9-18-43)

L-287—Amend. 1 modifies certain restrictions on the use of metals. (9-16-43)

L-315—Order limits the use of steel, copper, brass, etc., in the manufacture of secondary electrical distribution equipment. (9-16-43)

M-11-a—Amended order provides that no producer can ship any zinc oxide of a ton or more on an unrated order, but may continue to fill unrated orders of less than one ton, provided such shipments do not conflict with any rated orders. (9-13-43)

M-18-b—Amended order places primary chromium chemicals under allocation control. (9-16-43)

M-126—Amend. 1 requires WPB approval for use of gutters, spouting, conductor pipes and fittings in dwellings of two stories or less. The ban on the manufacture of pipe cleaners has also been lifted. (9-14-43)

P-126—Amended order simplifies procedure for obtaining repair parts and materials of essential industrial and commercial refrigerating and air conditioning systems and also removes provisions limiting the use of preference ratings to service agencies holding certificates of authority and serial numbers issued by WPB. (9-16-43)

P-142—Amended order substitutes the allotment symbol T-7 for the previous symbol MRO-P-142 on purchase orders and deletes sections of the original order which are now obsolete. (9-18-43)

WPB Directive 5—Revoked. (9-15-43)

Price Briefs

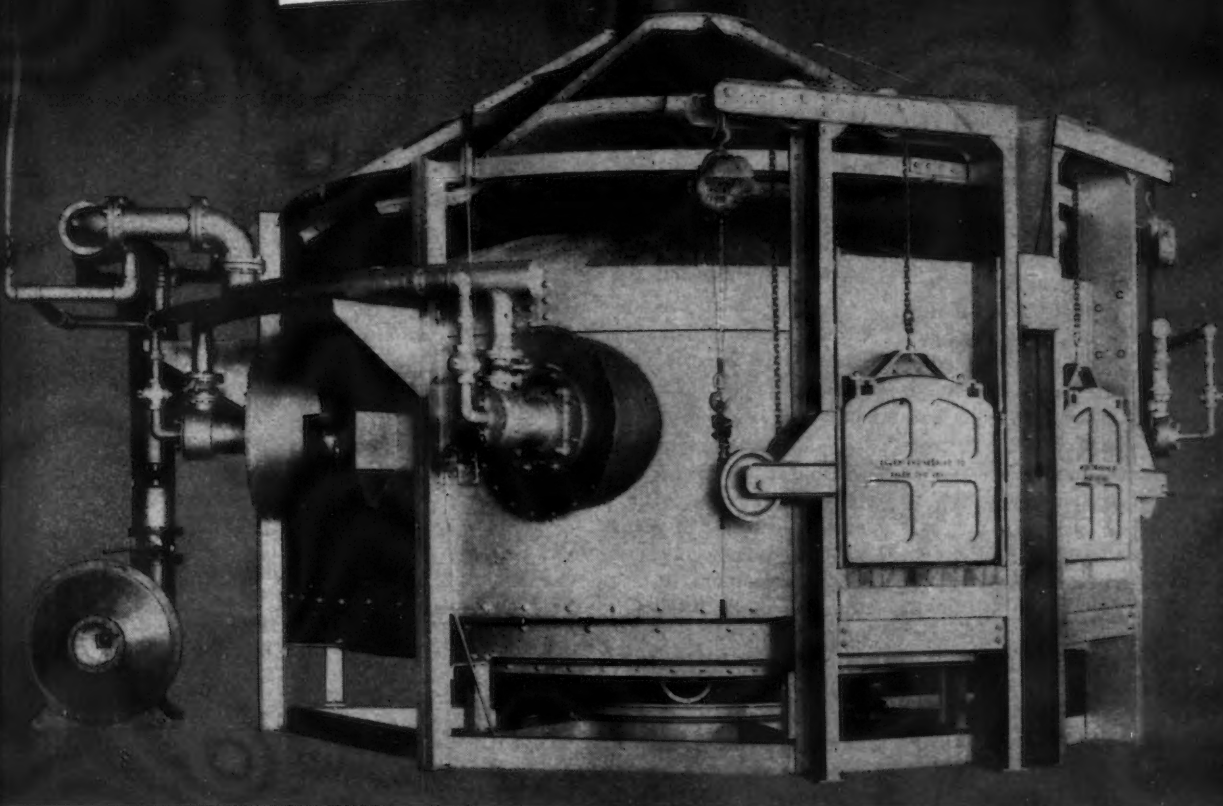
• MPR 465 establishes specific prices for 1300 sizes and combinations of used pressure vessels and used enclosed atmospheric pressure vessels. (Release No. OPA-3104)

• Amend. 2 to MPR 413 maintains prices at present levels and authorizes jobbers of hinges and butt hinges to use their customary form of billing. This applies only to jobbers located in Zone 2. (Release No. OPA-3124)

• Amend. 1 to RMFR 126 exempts optical grades of fluorspar from price control. (Release No. OPA-3131)

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New Instructions Issued on CMP Allotments, Loss or Theft, MRO Ratings

Washington

• • • WPB issued CMP instructions on Sept. 14 relative to allotment procedure, the loss or theft of controlled materials in transit, and the adjustment of a new pattern of preference ratings to be applied to maintenance, repairs and operating supplies.

Instead of making allotments to suppliers, Class A product manufacturers were told that they could follow any one of the four procedures if suppliers consent.

The procedures are: (1) Sale to supplier from manufacturer's inventory; (2) furnish material to supplier on toll or processing agreements—title to material remains with manufacturer; (3) manufacturer may place controlled material order for delivery to himself, the material being transhipped to his supplier, either by sale or under toll or processing agreements; (4) the placement of controlled material order for delivery direct to supplier.

In none of these cases, does the customer make an allotment. The supplier does not have to keep allotment records. However, the supplier must keep records showing that the materials is being used for the purpose for which it was received.

Customers furnishing the material must include it in applications for allotments. A manufacturer may not furnish controlled materials if an allotment would be prohibited under CMP Regulation No. 1.

Consequently, the four procedures may not be used to make allotments to producers of Class B products, unless special permission is granted by WPB. Under paragraph (g) of CMP Regulation No. 1, consumers may not make allotments to Class B product manufacturers. These instructions were contained in Interpretation 16 to CMP Regulation No. 1.

Manufacturers of Class A products have the right to ask for allotments from their customers for the quarter in which the allotments are needed to get delivery of controlled materials WPB ruled in issuing Direction No. 27 to CMP Regulation No. 1.

If the manufacturer is asking for an allotment to replace inventory of controlled materials which he will use in the manufacture of the Class A product, he may ask for it in the quarter for which the order is placed or for any of the next three quarters.

Manufacturers do not have to accept orders for such products unless their requests for allotments, within the specified time limits are complied with.

Interpretation No. 11 to CMP Regulation No. 1 indicates that a manufacturer of Class A products must fill orders out of excess stocks if the size of his inventory prohibits acceptance of delivery of controlled materials. Nevertheless, a manufacturer may insist on an allotment before accepting an order for a Class A product, if the quarter for which he is seeking the allotment is within the time limit permitted by Direction No. 27.

Operation of the special allotment procedure established by Direction No. 22 to CMP Regulation No. 1 was extended through the first and second quarters of 1944, by an amendment.

This procedure, originally scheduled to operate only during the third and fourth quarters of 1943, permits manufacturers of Class A products who do not receive allotments from their customers in time to permit them to make full use of them to apply for special allotments to the appropriate WPB industry division or claimant agency. Such allotments will be granted only under extraordinary and urgent circumstances.

Whenever CMP Regulation No. 1 requires that an allotment be returned to the concern from which it was received, and it is impractical to do so, a secondary consumer may hereafter return allotments to the appropriate WPB industry division or claimant agency. This privilege is provided by Direction No. 26 to CMP Regulation No. 1.

Whenever controlled material is lost or stolen in transit, it must be replaced by the company with whom the order for it was placed without requiring a new allotment, WPB says.

This ruling, contained in Direction No. 28 to CMP Regulation No. 1 indicates that the replacement order should be treated by the producer in the same way a replacement order for defective controlled material is treated under Direction No. 16 to CMP Regulation No. 1. Generally, this means that the replacement order takes preference over all other orders.

Warehouses must give a replacement order preference over all other orders in the absence of instructions to the contrary. However, if a warehouse is unable to fill a replacement order immediately, the customer may cancel the order and place a new order with another warehouse which can make immediate delivery. The customer's allotment account will not be further charged.

WPB says that the direction does not affect the rights or liabilities of any person with respect to lost or stolen material.

Preference ratings assigned for maintenance, repair and operating supplies under CMP Regulation No. 5, have been adjusted to a new pattern of relative urgency, recently established by the Requirements Committee.

Additional CMP Developments

• Dir. 29 to Reg. 1 rules that orders for copper and copper-base alloy controlled materials, bearing allotment numbers of the Office of Economic Warfare or the Office of Lend-Lease Administration may be accepted by brass mills, copper wire mills and copper and copper-base alloy foundries, even though the date and place of delivery are not specified. (Release No. WPB-4232)

• Int. 17 to Reg. 1 points out that copper flake powder is not included in the term copper or copper base-alloy appearing in Schedule I of CMP Reg. 1, and consequently is not a controlled material. (Release No. WPB-4230)

• Dir. 3 to Reg. 3 rules that rated orders placed by procuring claimant agencies must be accompanied by an appropriate allotment symbol, even though the item purchased is not programmed and is not purchased under the CMP. (Release No. WPB-4230)

• Amend. 4 to Reg. 1 further defines the conditions under which a producer may accept orders for and make deliveries of controlled materials.

• Int. 18 to Reg. 1 points out that manufacturers operating under CMP must not attempt to trace the ultimate end-use of their products for the purpose of indicating the claimant agency pattern which is required in Section A of Form CMP-4B application. (Release No. WPB-4240)

• Supplement I to Bulletin 31 has been revised giving additional CMP allotment symbols not identified with a specific claimant agency program or WPB Industry Division Class A and B products.

• Sched. I and II of Reg. 5 have been modified to reflect the existence of specific MRO preference rating orders which are applicable to specific industries. Dir. 12 indicates that orders placed for MRO items prior to Aug. 16, 1943, for delivery in the third and fourth quarters, need not be down-rated in the case of producers of products or businesses which have been moved from Schedule I to Schedule II. (Release No. WPB-4226)

• Amend. 1 of Dir. 22 to Reg. 1 extends the operation of the special allotment procedure, established by Dir. 22, through the first and second quarters of 1944. (Release No. WPB-4223)

• Dir. 28 to Reg. 1 rules that in cases where controlled material is lost or stolen in transit it must be replaced by the person with whom the order for it was placed. (Release No. WPB-4222)

• Dir. 27 to Reg. 1 rules that manufacturers of Class A products have the right to ask for allotments from their customers for the quarter in which the allotments are needed to obtain delivery of controlled materials. (Release No. WPB-4220)

• Dir. 26 to Reg. 1 gives provisions for procedure in the return of controlled material by a subcontractor. (Release No. WPB-4225)

• Dir. 30 to Reg. 1 instructs mills not to accept any order for copper water tubing, types K, L, or M, until they have received specific authorization in writing from WPB.

• Dir. 31 to Reg. 1 provides that on the last day of each month each brass mill is to close its order books for the following month for ammunition-brass strip, rod and tube. WPB will then schedule any open capacity which may occur.

• Dir. 11 to Reg. 5 rules that safety equipment may be purchased by an employer for re-sale to employees through the use of ratings available under CMP 5.

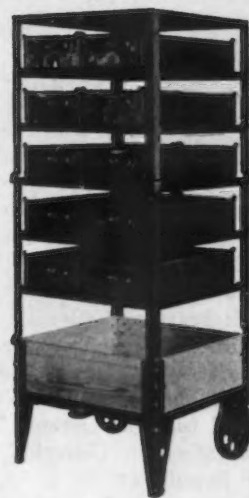
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Copper Orders Acceptable Without Dates

Washington

• • • Orders for copper and copper-base alloys under CMP, bearing allotment numbers of the Office of Economic Warfare or of the Lend-Lease Administration may be accepted by brass and copper producing mills and foundries, even though the date and place of delivery are not specified, WPB said Sept. 15, in announcing Direction No. 29 to CMP Regulation No. 1.

Such orders must be otherwise complete and be validated with allotments for the quarter in which the material is to be produced. Producers are to hold the material for the account of customers, and make delivery at the time and place under later instructions.

Meanwhile, WPB announced that to permit brass mill operators to schedule full operations, the armed services have agreed to a cut-off date on directives covering ammunition brass strip, rod and tube production. This ruling is contained in Direction No. 31 to CMP Regulation No. 1.

On the last day of each month, brass mills will close their order books for the following month as far as ammunition brass strip, rod and tube is concerned. Immediately thereafter, the operator must report to the WPB any open capacity for producing these materials, and WPB will immediately schedule the open capacity.

WPB also ruled that brass mills may not produce any type K, L or M water tubing until they have received specific written authorization from WPB to fill orders for it.

Interpretation No. 17 to CMP Regulation No. 1, issued at the same time, says that copper flake powder is not included in the term "copper or copper base-alloy powder" appearing in Schedule I of CMP Regulation No. 1, and consequently is not a controlled material. However, copper flake powder continues to be governed by the provisions of Orders M-9-b and M-9-c.

Coal Tar Discounts Must Be Continued, OPA Says

Washington

• • • Customary discounts and allowances given to purchasers of different classes of coal tar must be continued under the products recently issued specific maximum price regulation, OPA reminded coal tar producers on Sept. 15. Reports that some producers have discontinued their discounts and are charging the specific maximums listed in Price Regulation No. 447 (Coal Tar) have reached OPA.

The coal tar regulation which went into effect Aug. 20 provides that the specific dollar - and - cent maximum

prices established are subject to all customary discounts and allowances for sales to purchasers of different classes. Classes of purchases established under GMPR prior to the issuance of the coal tar measure cannot be charged more than the listed price ceiling minus their regular discounts and allowances, OPA stated.

Resources Protection

Continued by WPB

• • • Establishment of a Resources Protection Division and the continuation of the Resources Protection Board, whose duties are to assist in the protection of the nation's important war facilities and resources from destruction by enemy activity or other hazards was announced by WPB.

The Resources Protection Division was created as a unit of the Facilities Bureau, and it absorbs the functions and personnel of the Resources Analysis Section of the Industry and Facilities Branch, Bureau of Planning and Statistics. Among its functions will be the furnishing of staff services to the Resources Protection Board.

The Resources Protection Board determines the relative importance of plants, facilities, installations, and other economic resources to the war program from the point of view of protection against all hazards. Among these hazards are injury or destruction by enemy activity, accident, fire sabotage, subversive activity espionage,

age, and other efforts to obtain secret information regarding economic resources and the war program.

In addition to furnishing staff work for the Resources Protection Board, the newly-created division will advise appropriate agencies, particularly industry and materials divisions of WPB and the Army-Navy Munitions Board, with regard to the allotment of materials and equipment for the protection of facilities. Upon request, the division will assist agencies with protective responsibilities to assure the adequate protection of vital resources.

Another function of the division is to advise procurement services, as well as the Production Resources Division of the Facilities Bureau, of instances where concentration of war production or of vital facilities imperils the continued production of war goods and to develop plans for transferring production to alternate facilities in the event of interruption.

The new division will be headed by V. E. Tobin, who has the title of director. The post of chairman of the Resources Protection Board was made vacant by the death of M. E. Simpson.

Rated Orders Must Have Allotment Symbol

Washington

• • • Rated orders placed by claimant agencies must be accompanied by appropriate allotment symbols, even though the item purchased is not programmed and not purchased under CMP, WPB said last week in Direction 3 to CMP Regulation No. 3.

For example, if a local Army procurement officer purchased a Class B product by use of Form PD-3A, assigning preference rating AA-1, the order must be identified by an allotment symbol such as "W-1."

Refrigeration Repairs Eased By WPB Amendment

• • • Steps have been taken by WPB to facilitate more prompt emergency maintenance and repair service for essential industrial and commercial refrigerating and air conditioning systems. Preference Rating Order P-120 as amended Sept. 16 simplifies procedure for obtaining repair parts and materials, and also removes provisions limiting the use of preference ratings to service agencies holding certificates of authority and serial numbers issued by WPB.

Allotment Percentages Explained By WPB

• • • A certain amount of confusion exists as a result of some controlled material consumers receiving fourth quarter allotments with percentages granted for first and second advance quarters while others received only straight fourth quarter quotas.

WPB's answer to this riddle is that those who received no percentages for advance quarters probably asked for none in making application. Those who did request advance allotments received percentage allotments, mostly on a sliding scale basis—80-60-40 per cent consecutively for advance quarters. Regardless of promised percentage quotas, WPB says application for each quarter is still required.

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"Is This What The Fuhrer Meant By Lebensraum?"

R. A. F. Raids in Ruhr Valley Cause Bottlenecks in German Industry

By OSWALD DUTCH

••• The intensified R.A.F. offensive against the Ruhr Valley has not only caused dislocation and breakdowns in the iron and steel industry of that particular area, it has created bottlenecks which vitally affect the entire Nazi war machine.

The two West-German provinces of the Rhineland and Westphalia, which include the Ruhr district, produce 58 per cent of the whole steel output of the German Reich and 59 per cent of its pig-iron. The absolute production figures of this territory, compared with the rest of German and Continental iron and steel production in 1938 were:

	Million Tons Per Year	
	Pig Iron	Steel
Rhineland-Westphalia . . .	12.9	16.0
Rest of Germany	5.7	7.3
German-occupied Europe excluding Germany . . .	13.0	16.4
Europe and Germany (total)	31.6	39.7

These figures show that the Ruhr output of iron and steel alone is as high as that of all German-occupied Europe, excluding Germany. Thus over one-third of the entire iron and steel available to the German war machine comes from the Ruhr.

The entire Ruhr district contains 16.3 per cent or about one-sixth of the total population of Germany proper. It is compressed into an area of approximately 600 square miles which is only 1½ times as large as Greater London. Eight main railways connect the Ruhr with the rest of Germany while additional communications are provided by two important canals and the Rhine River.

During the last three months the R.A.F. offensive has been striking

four different blows at Germany's iron and steel industry:

- (1) By direct hits on the chief factories of the industry. For weeks and even months, Krupps and the Vereinigte Stahlwerke, Demag and Thyssen, have been put out of action. This has been confirmed by detailed British aerial photographs, which reveal also that a large number of furnaces and foundries have received direct hits.
- (2) The destruction by mines of the Eder and Moehne dams meant not only the cutting off of part of the Ruhr industry's electric supply; it meant also the dislocation of water supplies. Numbers of flooded factories have had to be temporarily abandoned and a proportion of the working population evacuated.
- (3) Some of the heaviest damage has been caused by the destruction of communications. Many thousand tons of valuable raw materials and half-finished products brought to the Ruhr for processing have been held up or destroyed in the main goods stations in Hamm, Essen, Dortmund and Duesseldorf and in the large canal and Rhine ports throughout the entire territory.
- (4) The hasty evacuation scheme, gigantic difficulties in food distribution as well as in getting workers to the factories owing to streets being shut off and train services dislocated, have for

weeks prevented the most important factories from working their regular shifts.

The Ruhr's iron and steel industry cannot be transferred to other parts of Germany or to occupied Europe. Not only would this take an incredible time, but hundreds of thousand of workers would be needed to erect similar plants in other parts of Europe, say in Upper Silesia, Czechoslovakia or in the mining regions of Eastern Austria. And these workers are not to be had now in Germany.

Repercussion of bomb damage on the whole of German industry is colossal. For a long time German factories have had little or no working reserves of raw material upon which to fall back. They are absolutely dependent on punctual deliveries of new supplies from the Ruhr Valley. Not only have factories in the Ruhr district itself been compelled to cancel shifts, but in all other parts of Germany today factories of the iron and steel industry often have to stop work for hours or even days because they lack the raw material.

One of the Zuerich "Weltwoche's" special correspondents has described a tour through German factories as follows:

"The average German has become anxious and critical regarding the capacity of production of German industry because, either from his own experience or from his fellow-workers' accounts, he is aware that production has suddenly to be suspended from time to time. In individual cases the reason is that owing to an air raid on one factory delivery of essential spare parts to another is considerably delayed and interruption in the work of the whole concern is inevitable.

"Schedule of production in the German factories can hardly ever be adhered to now. Sometimes only 50 per cent of the planned output can be realized; the average is 70 per cent although the program has already been reduced since last year. Breakdown of transport is almost invariably the cause. There are not enough locomotives, trucks or lubricants for the whole of the rolling-stock. Air raids on important railway lines, particularly large junctions, cause confusion and loss of time in ever widening circles, as would a stone thrown into a pond.

"Today's lack of materials is evident in every branch of production. Germany can now only produce 45 U-boats a month, for instance, whereas the capacity of the German shipyards would allow of the building of twice that number."

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Famed "Bazooka" Described, in Part

• • • Coinciding with the first public display of the "bazooka," the Army's new rocket gun, ordnance officials this week released additional details of the weapon's construction.

The bazooka launcher, or gun, was described as being a metal tube somewhat more than 50 in. long and 3 in. in diameter, open at both ends. Attached to this tube are a shoulder stock and front and rear grips for the firer, together with sights and an electric battery for setting off the rocket propelling charge. The tube is also equipped with various safety devices to prevent unexpected or premature firing.

The rocket projectile is heavier than a hand grenade and is about 2 ft. long. It has an appearance of a small,

ARMY'S NEW ROCKET GUN: The rocket in the top picture is the charged used in the famed "bazooka." It has the appearance of a small elongated aircraft bomb, and is made up of an explosive head, a tube containing the propelling powder charge and a finned tail. The gun itself, shown in middle picture, is more than 50 in. long and 3 in. in diameter and open at both ends. In the bottom picture soldiers load a new type anti-tank rifle grenade into their guns. The grenade used is similar to the "bazooka" projectile, but smaller in size.

elongated aircraft bomb. Its components are an explosive head, a tube containing the propelling powder charge, and a finned tail.

The bazooka is operated by a two man team—a firer and a loader. When the launching tube is held in firing position, the loader stands to the rear and to the right of the firer. After the loader has inserted a rocket, he turns a contact lever to "fire" position, signals ready to the firer and then drops down and away from the rear of the launcher tube. The bazooka may be fired from any position which may normally be used by a rifleman.

The War Department description added that the bazooka supplements rather than supersedes other weapons. Raiding groups, tank hunting parties and reconnaissance elements have reported it highly effective.

Earlier discussions of the racket gun have revealed that under certain conditions its effectiveness approaches that of a 77mm. field piece, but its range is rather short.

Inquiry by THE IRON AGE for further details concerning the materials and manufacturing processes used in producing the bazooka brought the reply that such data were still highly restricted.



Iron & Steel Engineers to Discuss Steel Mill War Problems at Conference

Pittsburgh

• • • With steel production increasing at a rate far surpassing the imagination of old timers, and with the war fronts changing every week, attendance at the annual meeting and engineering conference of the Association of Iron and Steel Engineers, at the William Penn Hotel here, Sept. 29 through 30, is expected to draw a large serious-minded audience.

As F. E. Flynn, president of the Association, says, "we in the industry must beware of overconfidence and false optimism, as 1943 proceeds with encouraging reports on the progress of our armed forces on the global battle fronts. We must work with unrelenting vigor, to keep war materials flowing from our plants in even greater volume. We can ignore no

opportunity to improve our products and increase our production."

Coincident with Mr. Flynn's challenge, the Association has arranged timely subjects for steel production and engineering men. Such subjects as the manpower situation, electrolytic tinning operations, plate mill developments, by-product coke plant yields, fuel problems, and safety, are a few of the highlights in the engineering conference. Because of war conditions, the Association will not have, for the second year in succession, its industrial exhibits.

Highlights at an informal dinner on Sept. 29 will be: A talk by W. Sykes, president, Inland Steel Co., Chicago, on "Retrospect and Prospects"; a first-hand report on the tremendous achievements of the steel industry will also be presented by G. T.

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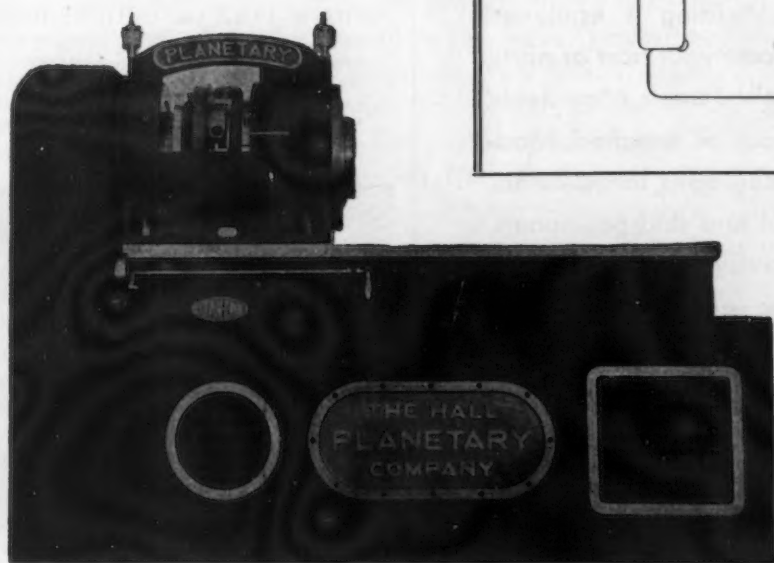
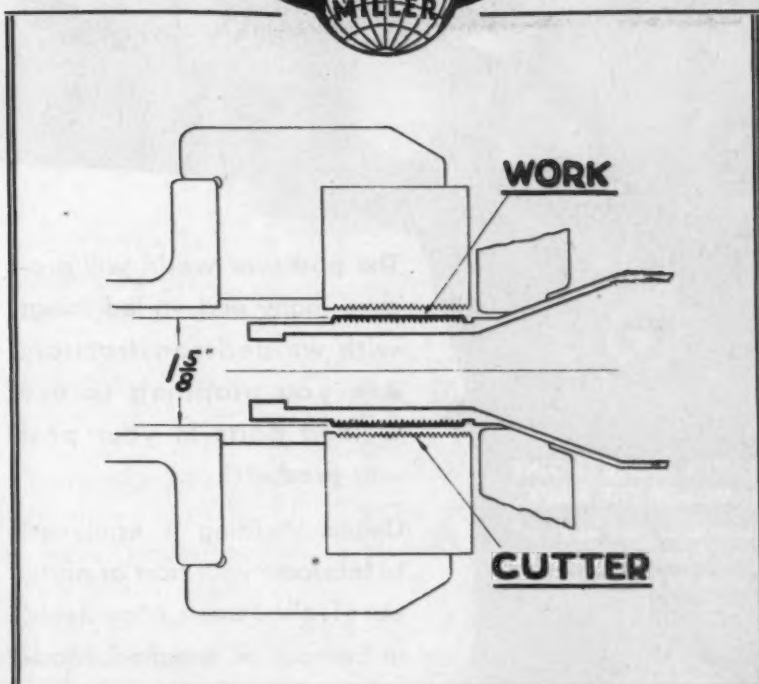
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Whiting, director, Steel Division, WPB, who will talk on "Steel After 22 Months of War."

The program of the Association's meetings, which begin Tuesday, Sept. 28, and end Thursday, Sept. 30, follows:

TUESDAY, SEPTEMBER 28

9:00 A.M.—REGISTRATION—Silver Room.

9:15 A.M.—BUSINESS SESSION—Urban Room.

9:30 A.M.—ELECTRICAL DIVISION—Urban Room.

"Fire Protection in Steel Plants," by C. A. Getz, director of research, Cardox Corp., Chicago.

"Robots vs. the Manpower Situation," by F. Mohler, engineer, Steel Mill Section, General Electric Co., Schenectady.

"Relay Protection of Distribution Lines," by L. L. Fountain, Switchgear Engineering Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

1:30 P.M.—MECHANICAL AND WELDING DIVISION—Cardinal Room.

"Plant Distribution Systems for Oxygen and Acetylene," by Herman Ullmer, manager, Process Service, Linde Air Products Co., New York City.

"Chain and Chain Repairs," by F. W. Shaw, Columbus-McKinnon Chain Co., Tonawanda, N. Y.

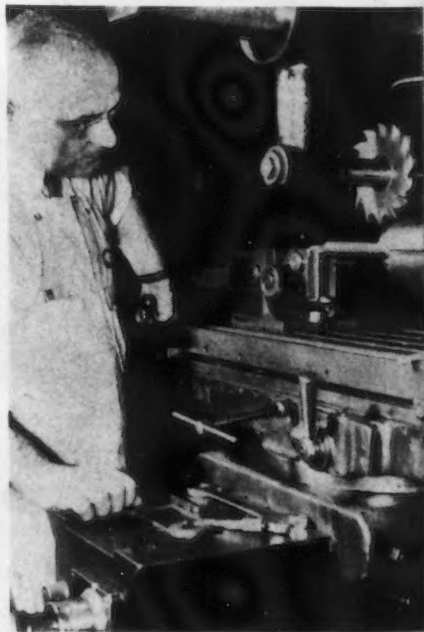
"Prevention of Corrosion in Water Systems," by H. M. Olson, Ohio Salt Co., Pittsburgh.

1:30 P.M.—OPERATING PRACTICE DIVISION—Urban Room.

"Industrial Engineering in War Production," by C. P. Spangler, industrial engineer, Jones & Laughlin Steel Corp., Pittsburgh.

"WHITE COLLAR" SHIFT: Hannibal Pardi, assistant corporation counsel for the City of Schenectady works the 4 p.m. to midnight shift as a tool maker in the Induction Mfg. Division of General Electric.

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THE IRON AGE, September 23, 1943—107

"Electrolytic Tinning Operations," by H. P. Munger, metallurgist, Republic Steel Corp., Warren, Ohio.
 "Steel for Cartridge Cases," by Lt. R. E. L. Stanford, Ordnance Department, United States Army, Cincinnati.

8:00 P.M.—Motion Pictures, selected subjects—Urban Room.

WEDNESDAY, SEPTEMBER 29

9:00 A.M.—ROLLING MILL DIVISION—Urban Room.

"Blooming and Billet Mills and Their Rolls," by F. C. T. Daniels and D. L. Eynon, Mackintosh-Hemphill Co., Pittsburgh.
 "Some Developments in Plate Mills," by W. A. White, superintendent of mills, Kaiser, Inc., Fontana, Cal.
 "Bar Mill Arrangement and Pass Design," by R. E. Beynon, superintendent of roll shop department, Carnegie-Illinois Steel Corp., South Chicago, Ill.

9:00 A.M.—COMBUSTION DIVISION—Cardinal Room.

"Fuel Oil Systems," by F. C. Frye, steam and fuel engineer, Great Lakes Steel Corp., Ecorse, Mich.
 "Pitch as an Open Hearth Fuel," by J. F. Wilbur, superintendent, fuel and combustion, Bethlehem Steel Co., Johnstown, Pa.
 Round Table Discussion—Burning the Lighter Oils in the Open Hearth.

1:30 P.M.—ELECTRICAL DIVISION—Urban Room.

"A New Method of Speed Control and Braking for A-c Cranes," by E. J. Posselt engineer, Cutler-Hammer, Inc., Milwaukee.
 "A-c and D-c Drives for Draw Benches and Wire Blocks," by R. A. Geuder, manager, metal industry applications, Reliance Electric and Engineering Co., Cleveland.
 "Electrical Equipment for Modern Arc Furnaces," by C. C. Leyy, industry engineering metal working section, Westinghouse Electric and Mfg. Co., East Pittsburgh.

1:30 P.M.—OPERATING PRACTICE DIVISION—Cardinal Room.

"Gas Yield and Economy in the Coke Plant," by R. W. Campbell, superintendent, by-product department, Jones & Laughlin Steel Corp., Pittsburgh.
 "Modern Trends in Blast Furnace Design," by Frank Janacek, blast furnace engineer, Republic Steel Corp., Cleveland.
 "Variations in Blowing Rates for Blast Furnaces," by E. L. Clair, vice-president, Interlake Iron Corp., Chicago.
 "Bedding and Reclaiming Metallurgical Raw Materials," by A. J. Boynton, A. J. Boynton & Co., Chicago.

7:00 P.M.—INFORMAL STAG DINNER—Ball Room.

Speakers: W. Sykes, president, Inland Steel Co., Chicago, Ill.—"Retrospect and Prospects." J. T. Whiting, director, Steel Division, WPB, Washington.—"Steel After 22 Months of War."

9:00 A.M.—COMBUSTION DIVISION—Urban Room.

"Pulverized Fuel for Heating and Metallurgical Furnaces," by L. S. Wilcoxson, The Babcock & Wilcox Co., New York City.
 "Colloidal Fuel as a War and Post-War Liquid Fuel," by J. G. Coutant, fuel engineer, New York City.
 "Feed Water Treatment for Weirton's

High-Pressure Station," by J. H. Strassburger, manager, maintenance and service, Weirton Steel Co., Weirton, W. Va.

9:00 A.M.—LUBRICATION DIVISION—Cardinal Room.

"Centralized Lubrication for Blast Furnaces," by A. J. Jennings, general sales manager, Farval Corp., Cleveland.
 "Lubrication of Non-Metallic Bearings," by G. E. Reiser, assistant lubrication engineer, Bethlehem Steel Co., Lackawanna, N. Y.
 Round Table Discussion—Lubrication Practices.

12:00—SAFETY LUNCHEON—Ball Room.

Speaker: W. A. Irvin, director, United States Steel Corp., and chairman of the board of trustees, National Safety Council, New York City.

2:00 P.M.—SAFETY DIVISION—Urban Room.

"Developing a Practical Safety Program," by A. H. Fosdick, superintendent of blast furnaces, Bethlehem Steel Co., Bethlehem, Pa.
 "Building Safety into the Plant," by H. J. Griffith, manager of safety and welfare, Jones & Laughlin Steel Corp., Pittsburgh.
 "The Responsibility for Safety," by W. Dean Keefer, vice-president, Lumberman Mutual Casualty Co., Chicago.

OPA Amends 250 Price Orders To Conform With Price Fixing Standards

• • • Amendment of 250 price regulations to show conformity with the Taft Amendment to the Emergency Price Control Act of 1942 relating to use of standards in fixing prices was announced last week by the Office of

Price Administration. There are now 444 price regulations in effect.

(The Taft Amendment to the Emergency Price Control Act of 1942, adopted as a rider to the Commodity Credit Corporation Act shortly before Congress recessed in July, permits ceiling prices to be fixed by reference to standards or specifications already in general use in the trade or required by other Government agencies, but prohibits further "standardization" of any commodity by OPA unless the Administrator finds that there is no practicable alternative for securing effective price control. This same amendment prohibited the requirement of grade labeling by OPA and that agency already has removed this requirement from 20 regulations.)

Regulations containing standards previously adopted by the trade or prescribed by some other Government agency are being amended by adding to their preambles statements to this effect. Others with standards which cannot be supported on one of these grounds but which the administrator has determined to be essential to effective price control have likewise been amended by including findings that there is no practicable alternative to their use if effective price control is to be secured.

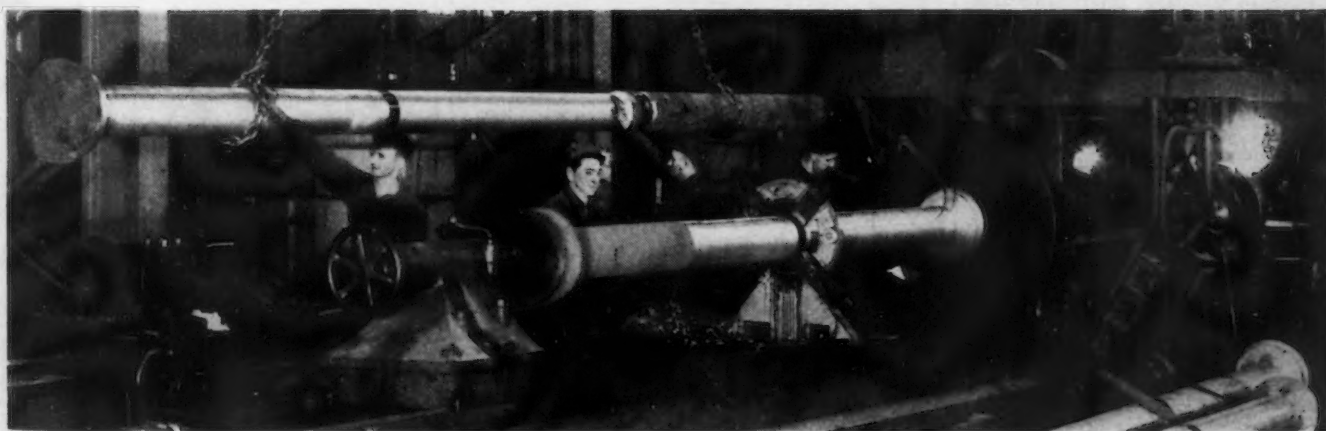
The action took the form of a series

"CHOOSING UP" FOR VICTORY: W. C. Dunn, president of Ohio Crankshaft Co., Cleveland, and Lt. John J. Healey, "choose up sides" with some of the athletic equipment recently given to the officers and crew of a Cleveland-built minesweeper by Ohio Crankshaft workers and management who sponsored the vessel.



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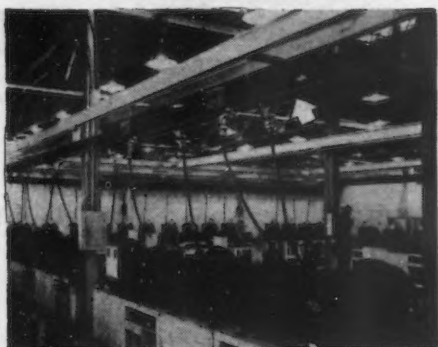
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BUStriction DUCT is quickly and easily installed—makes sensational savings in maintenance.

Capacities available for Plug-in Type Duct under new WPB standards are 250A, 400A and 600A.

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for Branch Circuits

(Left) End view of branch circuit plug mounted on a bus duct section—showing how copper "contact fingers" clamp over the busbars in the duct. Plugs are readily interchangeable. Capacities: 30A to 600A; 600 Volts or less.



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CONFORMS TO WPB LIMITATION ORDER 1-273

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of Supplementary Orders, effective Sept. 11, which amend the preamble of various price regulations in groups classified according to the nature of the commodities involved. In addition, a supplementary statement of considerations was issued in support of each amended regulation, explaining the justification for the standards employed.

In the following tabulation of the price regulations and schedules affected, these key symbols are used:

RPS—Revised Price Schedule
MPR—Maximum Price Regulation
RMPR—Revised Maximum Price Regulation

The following regulations of interest to the metal trades contain standards previously adopted by the trade and the preambles of these regulations are being amended to indicate this:

Industrial Materials Price Div.

MPR 272—Cast-Iron Boilers and Radiation
MPR 3—Zinc Scrap Materials and Secondary Slab Zinc
MPR 8—Metal Scrap, etc. (Nickel, Monel Metal, Copper-Nickel)
RPS 12—Brass Mill Scrap
RPS 15—Copper
RPS 69—Primary Lead
RPS 81—Primary Slab Zinc
RMPR 126—Fluorspar
RMPR 138—Ferromanganese and Manganese Alloys and Metal
MPR 166—Zinc Oxides
MPR 198—Imports of Silver Bullion
MPR 202—Brass and Bronze Alloy Ingot and Shot
MPR 248—Manganese Ores
MPR 258—Chrome Ores
MPR 309—Platinum Group Metals and Their Products
MPR 314—Magnesium and Magnesium Alloy Ingot
MPR 405—Ferrosilicon and Silicon Ore
MPR 407—Ferrochromium and Chromium Metal
RPS 6—Iron and Steel Products
RPS 10—Pig Iron
RPS 41—Steel Castings

COMING EVENTS

Sept. 28 to 30—Iron and Steel Engineers convention, Pittsburgh.
Sept. 30 to Oct. 2—Society of Automotive Engineers, Los Angeles.
Oct. 1, 2—Electric Steel Furnace Committee, AIME, Pittsburgh.
Oct. 5, 6—Gray Iron Founders' Society, Cincinnati.
Oct. 5, 6, 7—National Safety Congress, Chicago.
Oct. 11, 12—American Society of Tool Engineers, Indianapolis.
Oct. 13 to 16—The Electrochemical Society, Inc., New York.
Oct. 14, 15—American Machine Tool Distributors' Association, Montebello, P. Q., Canada.
Oct. 18 to 22—National Metal Congress and Exposition, Chicago.
Nov. 10, 11—Industrial Hygiene Foundation, Pittsburgh.

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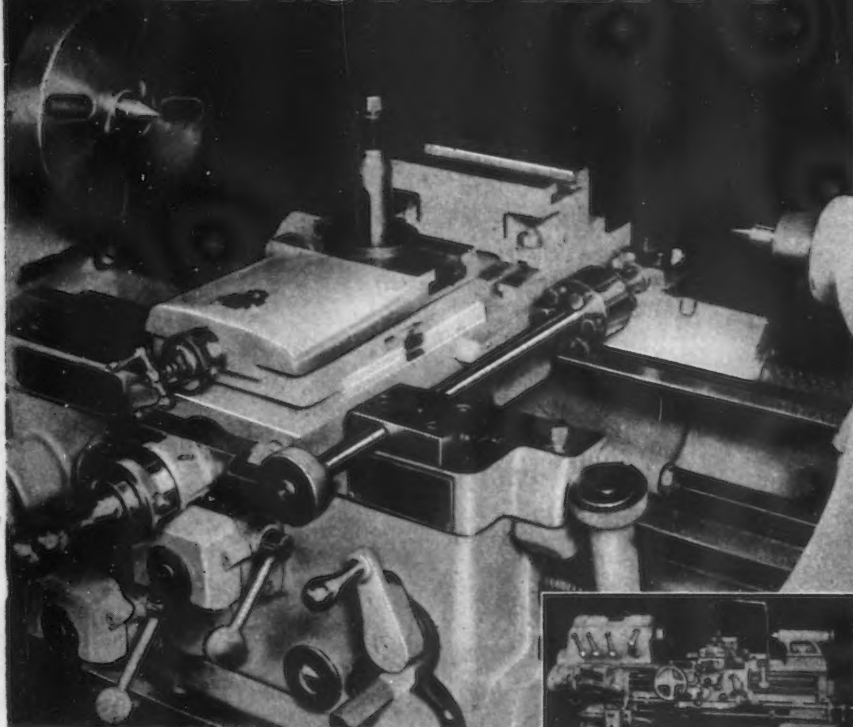
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NEWS OF INDUSTRY

- RPS 42—Used Steel Drums, Pails and Containers
- MPR 46—Relaying Rail, Relaying Girder Rail and Used Track Accessories
- RPS 49—Resale of Iron or Steel Products
- MPR 113—Iron Ore Produced in Minnesota, Wisconsin and Michigan
- MPR 147—Bolts, Nuts, Screws and Rivets
- MPR 159—Fabricated Concrete Reinforcing Bars
- MPR 214—High Alloy Castings
- MPR 310—Reusable Structural Steel Shapes, Plates and Castings

Industrial Materials Price Div.

- RPS 100—Cast Iron Soil Pipe and Fittings

In the following group are regulations in which the standards were used previously in the trade or were required by another Government agency:

Industrial Materials Price Div.

- MPR 317—Locks and Lock Sets
- MPR 413—Hinges and Butt Hinges
- MPR 2—Aluminum Scrap and Secondary Aluminum Ingot
- MPR 350—Packers' Tin Cans

The following regulations are amended by adding to their preambles that the Administrator has determined that no practicable alternative exists for securing effective price control, even though the standards are not those adopted by the trade or prescribed by some other Government agency:

Industrial Manufacturing Price Div.

- MPR 1—Second Hand Tools
- MPR 133—Retail Prices for Farm Equipment
- MPR 136—Machines and Parts and Machinery Services

Industrial Materials

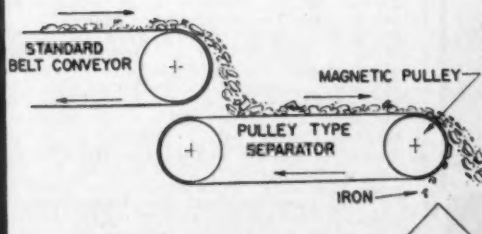
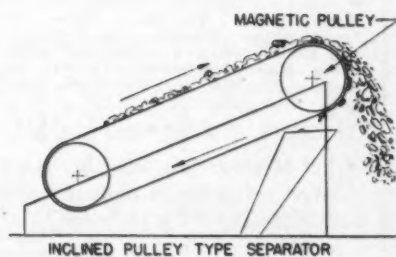
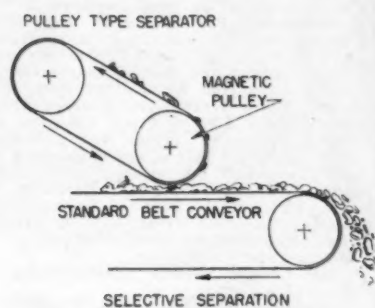
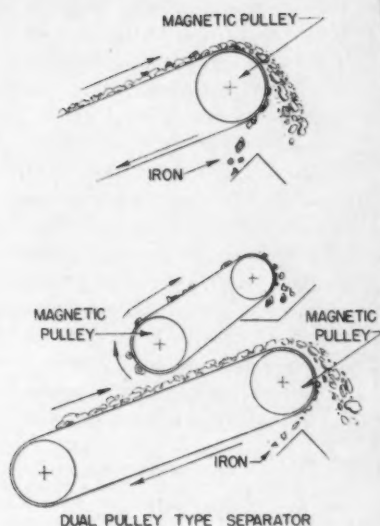
- MPR 416—Basic Refractory Brick
- RPS 17—Pig Tin
- MPR 20—Copper Scrap and Copper Alloy Scrap
- MPR 70—Lead Scrap Materials; Secondary Lead; Battery Lead Scrap; and Primary and Secondary Antimonial Lead
- MPR 302—Magnesium Scrap and Remelt Magnesium Ingot
- MPR 379—Tool Steel Scrap
- RPS 4—Iron and Steel Scrap
- RMPR 230—Reusable Iron and Steel Pipe and Used Structural Pipe
- MPR 411—Reusable Steel Storage Tanks (Field Assembled)

Ship's Builder Misnamed

• • • Construction of the ore carrier, J. Burton Ayers, was erroneously credited to the Great Lakes Engineering Co. in the Aug. 5 issue of THE IRON AGE, page 96. The ship was built by the American Ship Building Co.

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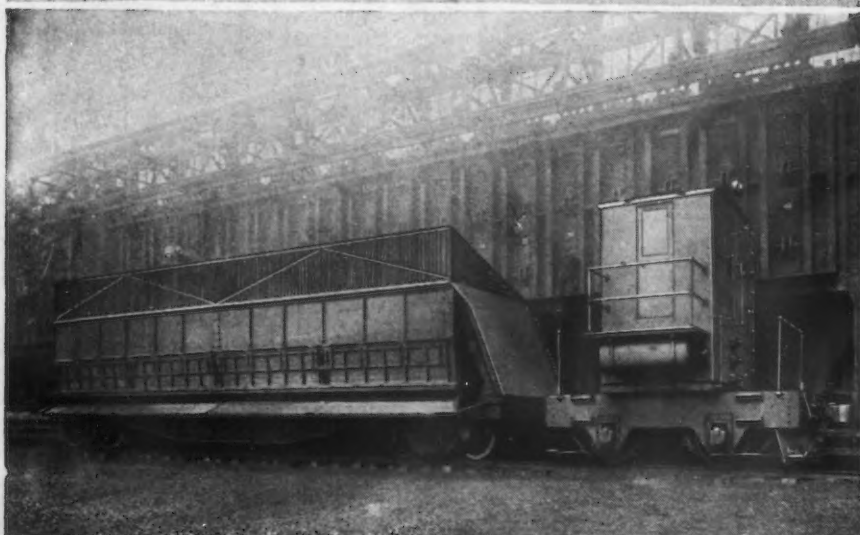
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NEWS OF INDUSTRY

OPA Completing New Advisory Set-Ups

Washington

• • • OPA's efforts to obtain a sound working relationship with business have brought about tangible results with the formation to date of 172 industry advisory committees, the Office of Price Administration announced last week. Only 16 of these committees existed in January 1943.

The oldest committees, in iron and steel and in paper, have a long record of continuous work with the agency on price regulations and amendments.

OPA said that within 30 days it expects to have complete coverage of the agency with from 250 to 300 industry advisory committees.

Among the metal trades the following committees have been established:

Iron and Steel Branch: Armament Steels and Alloys; By-Product Coke and Gas; Cold Finished Bars; General Steel Products; Iron and Steel Scrap; Merchant Pipe Warehouse and Jobbers; Pig Iron; Steel Castings; Steel Tubing; Malleable Iron Castings; Steel Warehouse and Jobbers; Secondary Steel Products Warehouse; Wire Products; Tool Steel; Iron Ore; High Alloys Steel Castings.

Machinery Price Branch: Drop Forging; Ensilage Cutter and Feed Mill; Harvesting and Haying Equipment; Farm Wagon; Tillage, Planting and Seeding Equipment; Spraying and Dusting Equipment; Farm Elevator and Blower; Tractor and Engine; Retail Motor Vehicle; Electric Fence Controller; Farm Dairy Equipment; Water Supply Equipment; Silo; Garden Tractor and Equipment; Barn and Barnyard Equipment; Farm Machinery and Equipment Supplies; Farm Machinery and Equipment; Poultry Equipment; Beekeeper Supplies; Diesel Engine Manufacturing; Commercial Motor Vehicles; Plastic Molders and Fabricators.

Non-Ferrous Metals: Non-Ferrous Foundries; Die Castings.

Consumer Durable Goods Branch: Office Machines Manufacturing; Typewriter Wholesalers; Typewriter Dealers; Typewriter Manufacturing; Furniture Manufacturing; Feather Processors; Domestic Cooking and Heating Manufacturing; Die Head Chaser and Collapsible Taps; Broach; Tap and Die; Drill and Reamer; Milling Cutter and Form Tool; Office Machine Dealers; Funeral Services; Funeral Supplies; Artificial Limbs and Orthopedic Appliances.

• • • Membership on the newly-formed refractories industry advisory committee of OPA includes:

J. B. Arthur, Mexico Refractories Co., Mexico, Mo.; C. E. Bales, The Ironton Fire Brick Co., Ironton, Ohio; J. L. Crawford, Walsh Refractories Corp., St. Louis; W. H. France, J. H. France Refractories Company, Snow Shoe, Pa.; A. P. Green, A. P. Green Fire Brick Co., Mexico, Mo.; Floyd L. Greene, General Refractories Co., Philadelphia; Roger A. Hitchins, National Refractories Co., Inc., Philadelphia; Otis L. Jones, Illinois Clay Products Co., Joliet, Ill.; A. H. Killinger, Laclede-Christy Clay Products Co., St. Louis; Charles Knupfer, Carborundum Co., Perth Amboy, N. J.; Fred B. Ortman, Gladding, McBean Co., Los Angeles; W. H. Peterson, M. D. Valentine and Bro. Co., Woodbridge, N. J.; J. E. Brinkerhoff, Babcock and Wilcox Co., New York; W. B. Coullie, Harbison-Walker Refractories Co., Pittsburgh; George A. Price, Diamond Fire Brick Co., Canon City, Colo.; D. D. Davis, Davis Fire Brick Co., Oak Hill, Ohio; John D. Ramsay, North American Refractories Co., Cleveland; John G. Remmey, Richard C. Remmey Son Co., Philadelphia; John T. Roberts, Stockton Fire Brick Co., San



We are not permitted to show photographs of work in progress, but we can say that this work includes . . .

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The airless centrifugal method of abrasive blasting and the equipment to which it is applied, are described and illustrated in this booklet. Equipment consists of the following machines: Tumbleblasts (barrel type mills), Tableblasts (plain and multi-rotary table types), and Cabinets for cleaning special work.

METAL WASHING EQUIPMENT

A special section is devoted to the discussion of metal washing problems and machines for handling them. Equipment includes entirely new principles of design and construction to meet the requirements for lower cleaning costs, reduced cleaning time, and more uniformly cleaned surfaces.

DUST COLLECTORS

A chapter is devoted to dust control problems. Included is a description of Dustube (cloth bag type) dust collectors of all sizes and types.

OTHER EQUIPMENT

Also included in this book are sections describing Sandcutters for reconditioning foundry molding sand; Rod Straightener and Shear Machines for reclaiming scrap core rods; and Sand Blast equipment including cabinets, rooms, tanks, nozzles, etc.

WRITE FOR CATALOG NO. 40.



American

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MISHAWAKA, INDIANA

NEWS OF INDUSTRY

Francisco; W. E. Robinson, Robinson Clay Product Co., Akron; W. P. Stevens, Atlantic Refractories Co., Macon, Ga.; Ralph L. Swank, Hiram Swank's Sons, Johnstown, Pa.; Clifford R. Taylor, Chas. Taylor Sons Co., Cincinnati; W. A. Turner, McLain Fire Brick Co., Pittsburgh.

• • • Appointed to the cast iron boiler and radiator committee are the following:

Virgel A. Good, sales manager, Burnham Boiler Corp., Irvington, N. Y.; Ralph P. Henderson, vice-president in charge of sales, United States Radiator Corp., Detroit; L. N. Hunter, vice-president, National Radiator Co., Johnstown, Pa.; Irving L. Jones, president, International Heater Co., Utica, N. Y.; Max D. Rose, assistant general sales manager, American Radiator & Standard Sanitary Corp., Pittsburgh; Carl Sawade, manager, Utica Radiator Co., Utica, N. Y.; Stanley K. Smith, vice-president, H. B. Smith Co., Westfield, Mass.; William R. Stockwell, manager, Manufacturing Div., Well-McLain Co., Michigan City, Ind.

• • • Ten executives of companies engaged in the manufacture of plastics and of items made from plastics other than finished consumer goods were named by the OPA to serve on a plastics industry advisory committee. Members include:

K. N. Atwater, Pro-phy-lac-tic Brush Co., Florence, Mass.; Roy E. Berg, Tech-Art Plastics Co., Long Island City; B. Franklin Conner, Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.; Charles C. Livingston, Cruver Mfg. Co., Chicago; J. D. McDonald, McDonald Mfg. Co., Los Angeles; D. S. McKenzie, General Electric Co., Pittsfield, Mass.; V. C. Petersen, R. D. Werner Co., Inc., New York; George K. Scribner, Boonton Molding Co., Boonton, N. J.; R. R. Titus, Synthane Corp., Oaks, Pa.; Morris Yellin, Superior Plastic Co., Chicago.

• • • A plumbing and heating jobbers industry advisory committee has been appointed by OPA. Membership includes:

W. A. Brecht, Hajoca Corp., Philadelphia; M. W. Dennison, Braman-Dow & Co., Boston; James A. Dwyer, Crane Co., San Francisco; W. J. Spillane, James B. Clow and Sons, Chicago; Josef Stein, R. Stein and Sons, Elmira, N. Y.; F. W. Swanson, Glove Machinery and Supply Co., Des Moines, Iowa; Charles Wilson, Horn-Wilson Co., Atlanta; J. A. Galloup, Galloup Pipe and Supply Co., Battle Creek, Mich.; Milton M. Goldsmith, Sam S. Glauber, Inc., New York; N. S. Highbotham, W. A. Case and Sons Mfg. Co., Buffalo; L. C. Hunt, Hunt Plumbing and Supply Co., Nacogdoches, Texas; A. J. Natemeyer, Sears, Roebuck and Co., Chicago; Hugh F. Oliphant, Tay Holbrook Co., San Francisco; John Seippel, Montgomery Ward Co., Chicago.

• • • Those named to the OPA war air furnace committee include:

Cliff Ackerson, Agricola Furnace Co., Gadsden, Ala.; Arthur J. Frazee, Dowagiac Steel Furnace Co., Dowagiac, Mich.; Irving L. Jones, International Heater Co., Utica, N. Y.; Lawrence B. Murphy, Williamson Heater Co., Cincinnati; Frank C. Packer, Payne Furnace & Supply Co., Inc., Beverly Hills, Cal.; Atlee Wise, Wise Furnace Co., Akron, Ohio; Arthur W. Wrieden, Lennox Furnace Co., Syracuse, N. Y.

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Broadened V Loan Plan to Aid War Contractors in Event of Termination

Washington

• • • Government guaranteed V loans will be made available to war contractors and subcontractors under a plan jointly announced by the War and Navy Departments, the U. S. Maritime Commission and the Federal Reserve Board.

"The plan is designed to assure con-

tractors that their working capital invested in war production will not be frozen in the event of contract terminations. Interest on loans guaranteed under the new program will be assumed by the government upon termination of contracts as under present Regulation V guarantees.

In the past, advances under V loans have been restricted, in general, to

working capital needs for war production. The broadening of the plan will enable contractors to obtain the use of most of their own working capital immediately upon termination of their contracts. Banks will be enabled to make such advances at once, and with a minimum of complications. The establishment of such credit arrangements will greatly minimize the problem of termination of war contracts.

The Services stress the fact that cancellation of contracts must not be construed as marking the beginning of a general curtailment of war production. On the contrary, with the war rapidly becoming one of movement, with great allied offensives in progress and in prospect, materiel requirements are subject to sudden and unavoidable changes, and it is essential to remove all possible causes of delays in war production.

The V Loan Program

The contractor or subcontractor will obtain a V loan exactly as at present except that, if the loan is intended to free his own working capital upon termination of contracts as well as to provide him with working capital needed to finance them, then there are to be two changes in the present guarantee agreement, viz:

(1) The bank will be required at all times to have a participation in the loan and, accordingly, the original percentage of guarantee specified in the guarantee agreement will not be increased by reason of contract cancellations, and

(2) The bank must share with the government any commitment fee, which may not exceed $\frac{1}{2}$ of 1 per cent per annum on the undisbursed portion of the credit, in the same proportion that the guarantee fee now bears to the interest payable on V loans, viz: if the percentage of guarantee is

	Gov't Share
60%	10%
65%	12½%
70%	15%
75%	17½%
80%	20%
85%	22½%
90%	25%

The amount of loans which a contractor will be entitled to obtain in the event of cancellations of his contracts will be stated in the loan agreement as a percentage of inventories, work in process, accounts receivable, and (without duplication) amounts paid or concurrently to be paid by him to subcontractors or suppliers by reason of contract cancellations. Subcontractors and suppliers will receive protection under this program, because a borrower will be required to pay them whatever he owes them in connection with the items used as a basis for the borrowing.

Loan agreements under the new program will include provision for such amounts of working capital to carry out war production contracts, as may be needed by the contractor in the particular case. In general, where the amount of credit needed to carry out the war production contracts is small in proportion to the amounts needed to free his own working capital upon contract terminations, the maturity of the credits under the new program may be longer and a minimum of restrictions will be placed upon the borrower by the guaranteeing agencies.

When cancellations of the borrower's contracts occur, the maturity of that part

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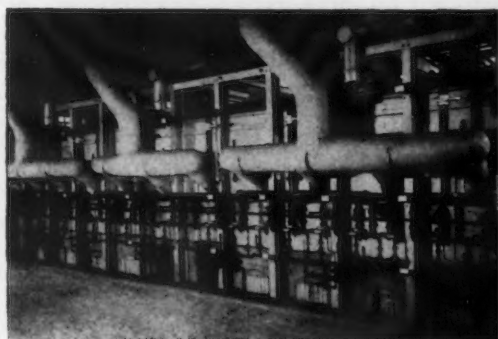
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of the loan proportionate to the amount of the contracts cancelled will be suspended and interest waived thereon, as is now provided under V guarantees. This suspension of maturity and waiver of interest will apply whether the funds have been advanced to the borrower before or after the cancellations have occurred.

Following are answers of the War Department, the Navy Department and the United States Maritime Commission given to certain inquiries which have thus far been made in connection with the broadened Regulation V program. The loans referred

to as "VT" loans in these questions and answers.

Is a guarantee agreement in order where war production contractor has ample working capital and only desires commitment because of doubts as to his future cash position in the event of the cancellation of his war production contracts?

Yes; but at least a portion of the funds to be provided under a "VT" loan agreement should be available to the contractor for financing war production as well as for financing termination settlements. This avoids any question as to the power to guarantee a loan to be made available solely after termination.

What is maximum maturity of commitments which would be approved by the services?

Three to three and one-half years, or term of settlement provided in guarantee agreement, whichever is shorter.



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DIVISION OF MATERIAL . . . into small batches for heating and quenching . . . provides uniformity after cooling.

WRITE FOR CATALOG No. 3979



W. S. ROCKWELL COMPANY
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Employment of Women in Certain Midwestern Industrial Centers

City	Per Cent of Total Employment	
	July 1, 1943	Expected Requirements, Jan. 1, 1944
OHIO:		
Akron	32.6	38.0
Canton	23.0	28.0
Cincinnati	31.1	34.4
Cleveland	28.7	31.9
Columbus	27.7	33.0
Dayton-Springfield	34.3	39.5
Toledo	28.7	33.1
Youngstown-Warren	20.6	22.5
MICHIGAN:		
Flint	21.3	25.6
Grand Rapids	34.1	37.0
KENTUCKY:		
Louisville	28.1	30.3

Is it intended there should be a breakdown between amount committed for "borrowed working capital" and amount committed for freeing borrower's "own working capital upon cancellations of his war production contracts" or is it intended there should be over-all credit and that the maximum amounts which may be borrowed for the two purposes should be limited by a loan formula?

It is intended that there should be an over-all credit, and the maximum amounts which may be borrowed may be borrowed for both purposes or divided between the two purposes, depending on agreement between the borrower and the bank as to the loan formula. The War Department will in general permit the full credit to be used for war production as well as on termination, but the Navy and Maritime Commission may in approving the terms of the loan require a limitation on the amounts to be drawn down before cancellation to amounts needed for financing war production. As indicated in question (1) a portion of the credit must be so made available at the borrower's election even though he may not choose to avail himself of the right to borrow until after termination.

Is credit available upon cancellations of war production contracts to be limited by amount of inventories, work in process, and accounts receivable, etc., which are allocable to cancelled contracts?

No. The credit may be predicated on total war production inventories and work-in-process, and accounts receivable attributable to both cancelled and uncancelled contracts. In addition the credit may be predicated upon moneys which have been used or are to be used concurrently to pay sub-contractors' claims on cancelled contracts without overlap, of course, with inventory or receivables.

In determining borrower's own "working capital" are bank loans, accounts payable, and other current liabilities to be deducted from current assets?

Yes.

Is amount of credit to be available upon cancellation of war production contracts to be limited by amount of borrower's "own working capital"?

No, since the formula might include payments to subcontractors in excess of then working capital or receivable representing a claim for facilities or expenditures expressly made reimbursable by the procurement agency, or the borrower may have a net minus working capital or just a heavily extended position.

Is amount of credit to be available upon cancellation of war production contracts to be limited by the proportion of borrower's "own working capital" which the borrower's investment in inventories, work in process, and accounts receivable which are allocable to cancelled contracts bears to his aggregate investment in inventories, work in process, and accounts receivable?

No, the credit to be available is to be a percentage of the investment in war production inventories and work in pro-



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Solnus Hydraulic Oils were in practically new condition ready for many more hours of extra service, while the other oils showed a deterioration to such a degree that they were ready to be changed.

This is only one of the many instances in which Solnus Hydraulic Oils have demonstrated their long life and ability to stand up under pressure. If you want to improve the operation of your hydraulic system call in a Sun specialist—one of those Doctors of Industry. He's ready, willing, and able to help you keep your production on a round-the-clock schedule. Write . . .

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Baker has re-designed many of its trucks to meet industry's needs for increased production:

1. Longer continuous operation
2. Faster handling of material
3. Lower maintenance

• The same advantages which have been designed into these trucks to speed the production of war goods also apply to normal peacetime material handling. The model illustrated, designated as Type H-3, is of 6,000 lb. capacity.

Improvements include a new hydraulic lift system which provides efficient, positive control of hoisting and lowering, increased battery compartment permitting longer continuous operation, operator's guard integral with frame for greater strength and safety, and other features which provide increased efficiency and easier maintenance... The new improved design is also available in 4,000 lb. capacity. (Type H-2.)

FOR INCREASED PRODUCTION AND EFFICIENCY

Larger battery box (32" x 39½") permits capacity to operate trucks continuously on longer shifts. Chamfered front top corner of battery compartment provides greater visibility for the driver. Sliding type battery cover is equipped with handles for faster servicing.

Controller, contactors, lift motor and pump are grouped together in a convenient control panel. Travel brakes easily adjusted by a single hex nut. Operator's guard built integral with frame for greater strength, provides handy compartment for carrying towing chain, pinch bar, or other tools.

Easy steering results from proper design and anti-friction bearings on king pins. All steering levers and rods are inside frame, protected against damage. Frame members are fabricated of heavy plate by hot riveting and arc welding.

Efficient hydraulic lift provides power lifting and gravity lowering, under absolute control at all times. 67" lift for two or three high tiering is standard.



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1211-1A-43



Baker INDUSTRIAL TRUCKS

NEWS OF INDUSTRY

cess and war production receivables and payments made or concurrently to be made to subcontractors.

Is credit available on cancellation of war production contracts to be made available to subcontractors as well as prime contractors?

Yes.

If borrower is prime contractor, may cancellation of war production contract upon which he is subcontractor be made a basis for credit?

Yes.

Is it desired that guaranteed agreements should be so drawn that financing institutions must assume burden of verifying inventories, goods in process and accounts receivable where loans are made based on cancellation of war production contracts or is it sufficient if loan agreement provides for certificates of borrower and provides that financing institution acting in good faith may rely thereon?

There is no change in policy in this respect from ordinary Regulation V loans. The financing institution may provide in the loan agreement for certification by borrower. Inasmuch as the financing institution in this type of loan will always have at least a 10 per cent interest, it is believed that it will have sufficient incentive to exercise reasonable care to obtain additional verification in those cases where that appears to be necessary.

Where borrower is presently being financed by Regulation V loan, can financing institution make commitment separate and apart from outstanding loan and guarantee and receive an independent guarantee therefor which does not require the financing institution to waive any protection afforded by section 5 of outstanding guarantee agreement?

In general it is believed that the existing V loan should be converted into a larger VT loan where the latter type of loan appears desirable. This will avoid serious problems of loans competing for collateral.

Is the policy of the War Department changed with respect to making Regulation V loans to borrowers who can readily obtain needed credit accommodation without a guarantee?

No. It is the view of the War Department that any contractor engaged in war production who needs money for that production, including sufficient to cover his tax liabilities with tax notes, can have a Regulation V loan. If the amount of borrowing sought is, however, obviously primarily for post-war protection, he will have to take a new type V loan or a "VT" loan. For instance, if a borrower needs \$7,000,000 for present war production and \$20,000,000 to cover his war production receivables and inventories on termination, to permit him to use his own working capital for re-conversion, if the loan comes in at \$20,000,000 it will be classified as a VT loan. If it comes in at \$7,000,000 it will be classified as an old form guaranteed loan. Moreover, in the case of a weak contractor, the tendency of the War Department as heretofore will be to approve as a Regulation V loan, a somewhat inflated credit on the theory that the financing institution needs additional protection in that type of case.

Where a bank makes a loan, after cancellation, under a commitment theretofore given, does borrower pay interest on the loan, or does service involved pay interest? If a correct interpretation of section 6, in such a case, is that the guarantor, rather than the borrower, pays interest, does not this section need revision? This point is raised in view of fact that first part of section 6 refers to adjustment of interest, which implies that borrower has previously paid it.

Where a bank makes a loan after cancellation under a commitment theretofore given, interest is waived and guarantor pays interest on a portion of loan proportionate to amount of cancellations, all as provided in section 6 of guarantee agreement. Borrower must make request for adjustment, and waiver of interest is effective from adjustment notice date, as provided by section 6. Not considered necessary to revise section 6, inasmuch as its provisions are applicable in the same way under the broadened program as under the ordinary type of V loan. "Adjustment" referred to in section 6 is the waiver of interest and suspension of maturity on the portion of the loan affected.

THE *Strategy* OF MAN-POWER

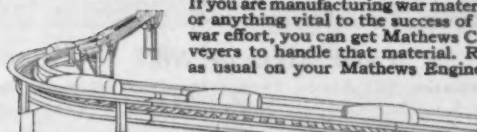


RELIEVING VITAL MAN-POWER of unnecessary fatigue . . . avoiding unnecessary handling . . . saving unnecessary steps . . . keeping a constant flow of material moving to waiting hands and machines, that's man-power strategy headed towards victory.

America's war industries from coast to coast are improving their per-man-and-machine-hour production schedules with the aid of Mathews Time-Coordinated Conveyor Systems.



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FOR GENERAL WIRE, eliminate "specials" from specifications if you have not already done so and, again, see that there is no waste.

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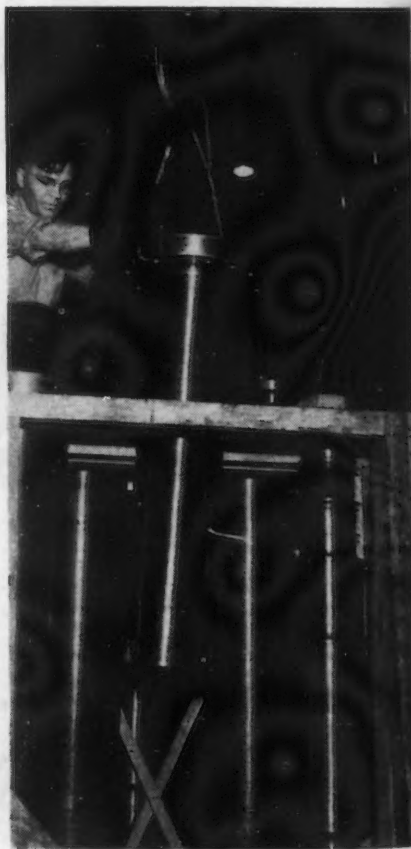
New York

••• The number of civilian employees of the New York Ordnance District Army Service Forces has been reduced 37 per cent since last Nov. 20, it was announced by Col. Gilbert I. Ross, district chief. The reduction was made possible under a streamlining policy, the colonel said.

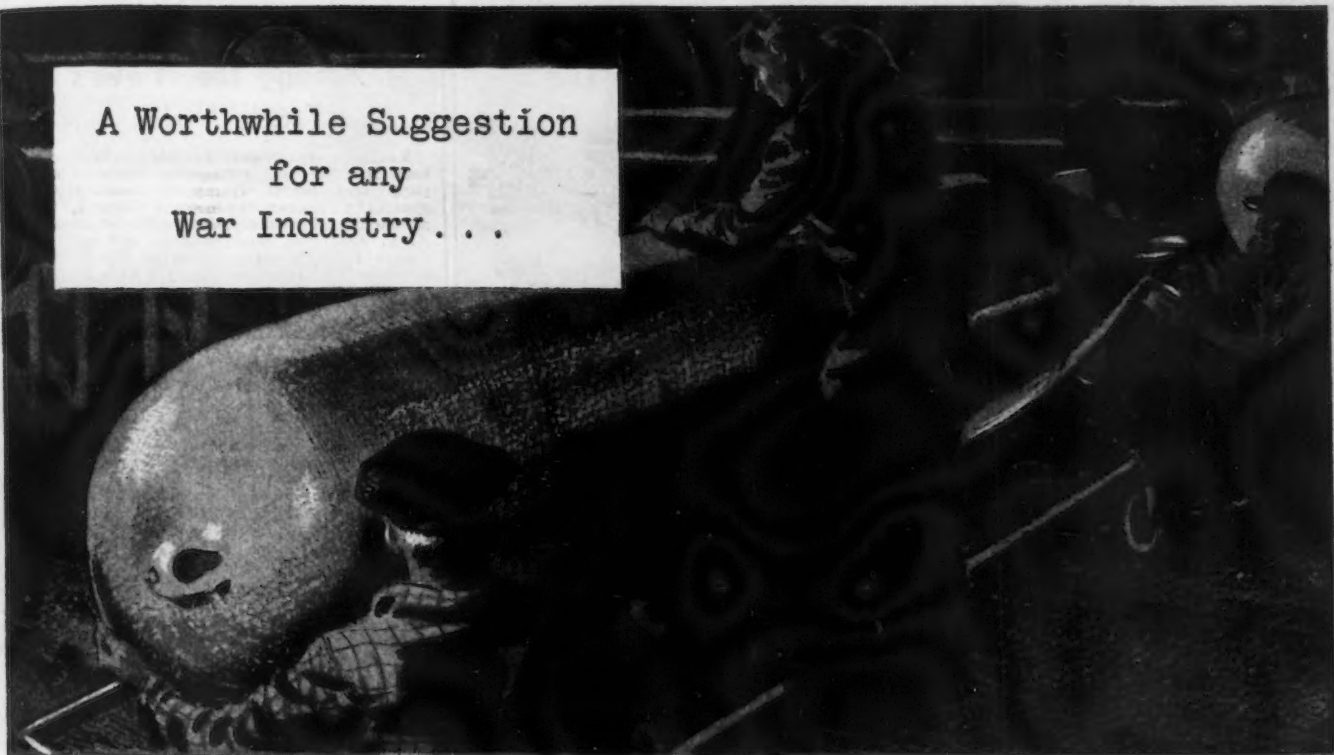
Colonel Ross said that the district was "adequately staffed long before Pearl Harbor," but that the beginning of our war participation "created an emergency which required a large increase in staff personnel."

"As the ordnance-industry team began to gather momentum and production lines of ordnance materiel began to flow steadily from factory to battle fronts," he added, "it became possible to give more attention to the 'streamlining' methods of procurement production, with the view toward increasing efficiency of engineering, expediting, inspection, etc., and at the same time reducing personnel."

RACKS SAVE SPACE: Wooden storage racks for motor shafts at General Electric's Schenectady Works save space and handling time, and minimize possibility of damage. Formerly the shafts were laid on the floor, requiring three times as much space.



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Take, for example, the instrument maker who recently received from another supplier stainless steel ordered to a Navy "spec". The steel did not meet his requirements, and, suspecting an off-analysis, he called upon Frasse for confirmation. Frasse, knowing the "spec" had been revised 3 times in two years, found the supplier had automatically (and correctly) furnished steel to the latest revision—an unusual analysis for special application only. Result: a ton of critical stainless steel sidetracked from the war effort, plus additional delay until the correct analysis could be obtained.

Frasse subsequently spent a day with the man-

ufacturer's purchasing director, designers, and metallurgists, compiling "spec" conversion charts and revising prints. "Spec" checking with Frasse is now a regular process with this war contractor.

Frasse, incidentally, regularly issues identification charts showing up-to-date Government specifications for alloy, stainless and carbon steels—copies are obtainable free from any Frasse office. Meanwhile, why not (1) always mention the effective date of the specification to which you order, (2) keep posted by regularly checking your purchasing records and blueprints with Frasse. *Peter A. Frasse and Co., Inc., Grand Street at Sixth Avenue, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Ave., Philadelphia 29, Pa. (Radcliff 7100-Park 5541) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • Jersey City, Hartford, Rochester, Syracuse.*



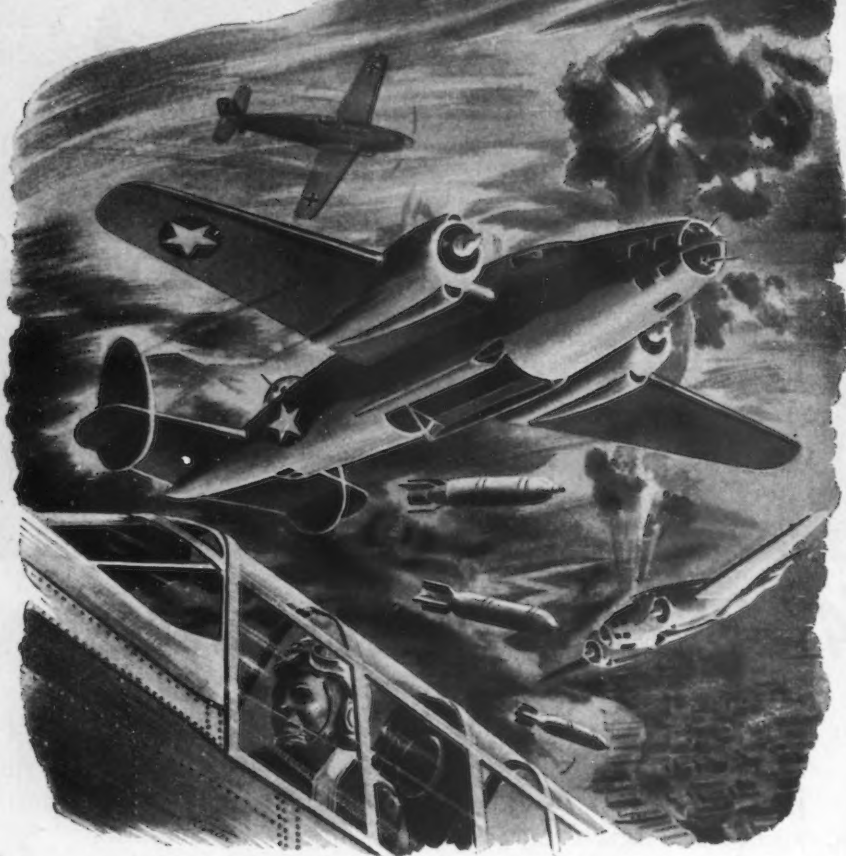
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The Andrews Steel Company produces a limited range of aircraft quality alloy plates.

NEWS OF INDUSTRY

Among the Week's Trade Notes

Ready-Power Power, Detroit, has recently been incorporated. Officers of the new company are: H. D. Gumpfer, president and general manager; William A. Butner, vice-president and manager, Ready-Power division; A. B. Frederick, vice-president and manager, Power Plant division; Arch R. Smith, vice-president and sales manager; Hobart D. Hoyt, secretary and treasurer.

Carpenter Steel Co., Reading, Pa., has announced the appointment of Austin-Hastings Company, Inc., as eastern New England distributors for Carpenter Tool Steels.

Formica Insulation Co., whose plant and general offices are located at suburban Winton Place opened an emergency wartime employment office, August 30, in the heart of Cincinnati's shopping and amusement district as a means of facilitating applications and conferences from prospective employees.

Hercules Powder Co., Wilmington, Del., has announced the establishment of a sales research division to investigate new markets for Hercules chemical products and to study the needs of industries served by the chemical company. Dr. John H. Long will be in charge of the new division.

W. K. Millholland Machinery Co., Indianapolis, have been appointed sales agents in Indiana, southern Ohio and northern Kentucky for the Watson Stillman Co., Roselle, N. J.

Cleveland Cap Screw Co., headed and threaded products manufacturers of Cleveland, Ohio, announce organization of their aircraft parts division, in charge of Howard R. Rush.

John S. Barnes Corp., Rockford, Ill., has opened an Eastern Sales office at 2093 Fisk Building, 250 W. 57th Street, New York City. The office is under the direction of E. C. Hawkins.

Redfern Construction Co., Ltd., Toronto, has taken over the management and operation of the shipyards of the Toronto Shipbuilding Co., Ltd.

The Industrial Brownhoist Corp., Bay City, Mich., announced a change of address for their Cleveland sales office effective Sept. 13. The new location is 1812 Terminal Tower, Cleveland 13.

Cooper Alloy Foundry Co., Hillside, N. J., announces the completion of a new plant to make centrifugally-cast alloy castings for aircraft and other services.

E. Harry Hart has purchased Platt's Machine Shop at Baraboo, Wis., and will expand its war production facilities.

Martell & Ferree, Philadelphia, will act as sales representatives in eastern Pennsylvania, Delaware and southern New Jersey for the C. O. Bartlett & Snow Co., Cleveland.

H. K. Ferguson Co., of Cleveland, has established an office for the southern district at 1012-14 Empire Building, Birmingham. C. W. Roberts is southern district manager for the company.

Bechtel-McCone-Parsons Corp. has entered into an agreement with the Ford Motor Co. to manufacture wings for Liberator bombers. The agreement, approved by the Army Air Forces, constitutes the first step by Bechtel-McCone-Parsons to manufacture bomber parts at its airplane modification center at Birmingham.

General Electric's Resin and Insulation Materials Division of the Appliance & Merchandise Department is moving its sales and order service headquarters office to 1 River Road, Schenectady, N. Y., from Bridgeport, Conn., Oct. 4.

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WITH THE INTRODUCTION of Lindberg Furnaces to the laboratory field, accurate regulation of temperatures is made available. You can now select the desired temperature required for carbon and sulphur determinations, special organic analyses, determination of the critical points of steel, fusions, ignitions, assaying, drying, and countless other laboratory operations where heat is employed.

SMOOTH, "STEPLESS" POWER INPUT

The Lindberg Input Control, an adaptation of Lindberg's famous industrial furnace control, provides a manual adjustment to operate the furnace at any desired temperature. This heat regulation is smooth and "stepless" in principle because it can be made in

Well-known Throughout the World as the Leaders in Developing and Manufacturing Industrial Heat Treating Equipment



LINDBERG

LINDBERG ENGINEERING COMPANY
2450 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

precisely any percentage of the total input of the furnace. Built-in transformers on the Combustion Tube, Crucible and Box type Furnaces, provide the reduced voltage for the heavy heating elements.

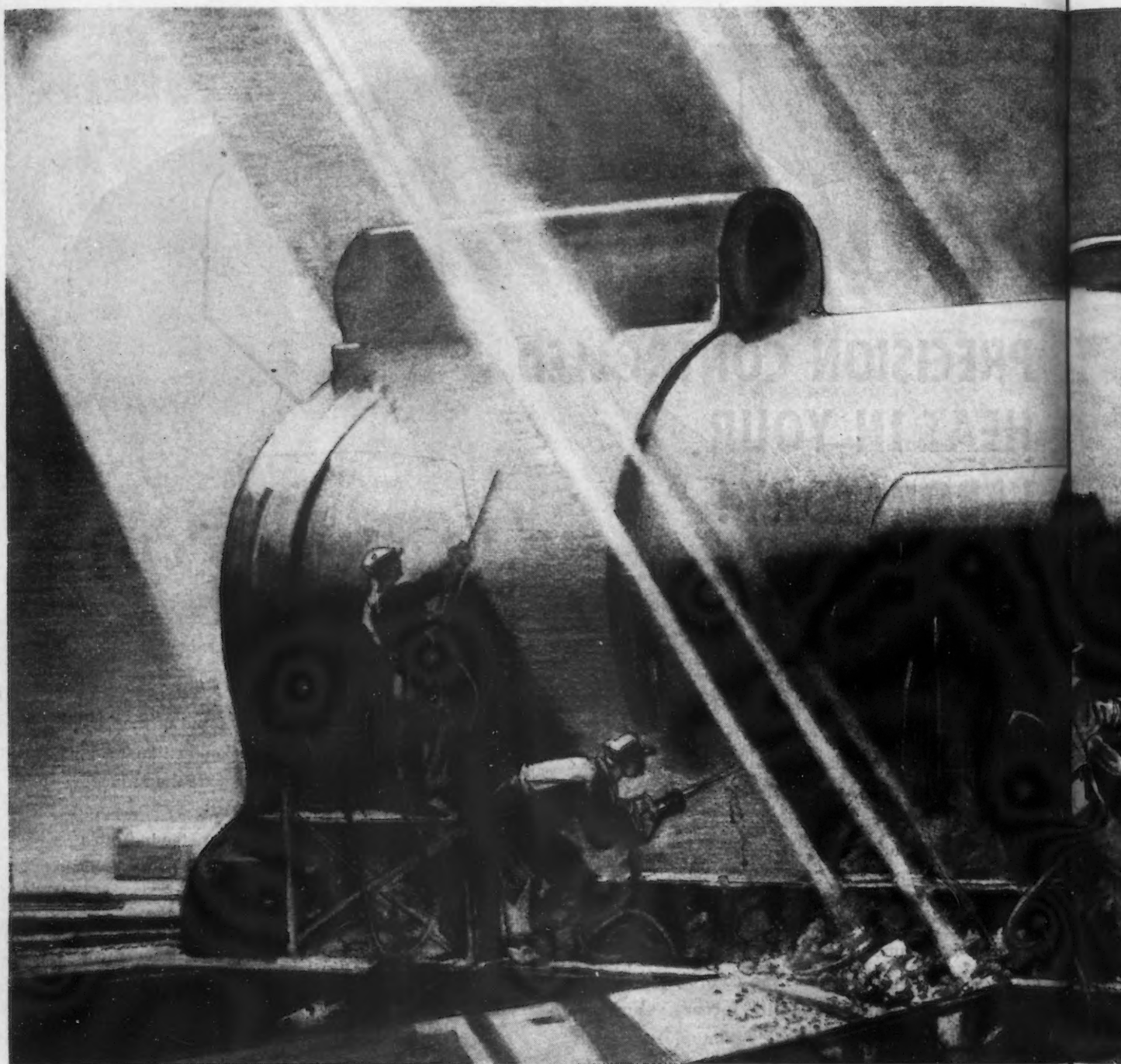
A high resistance, compensated pyrometer indicates the temperature at which the furnace is being controlled and a manually operated index pointer on the pyrometer can be set at the desired temperature, thereby making possible a visual check of the control setting as the furnace comes to heat.

RUGGED CONSTRUCTION

Lindberg Laboratory Furnaces are sturdily built of heavy sheet steel, backed by courses of high temperature insulating slab and refractory brick. Heavy, low voltage, heating elements permit higher operating temperatures with longer life and fewer replacements as compared with light gauge elements. The clean streamlined shape of the Lindberg Laboratory Furnaces matches in appearance other modern laboratory equipment and contributes to the high standard of laboratory cleanliness.

Phone or write your dealer today. He will be glad to give you further information and prices.

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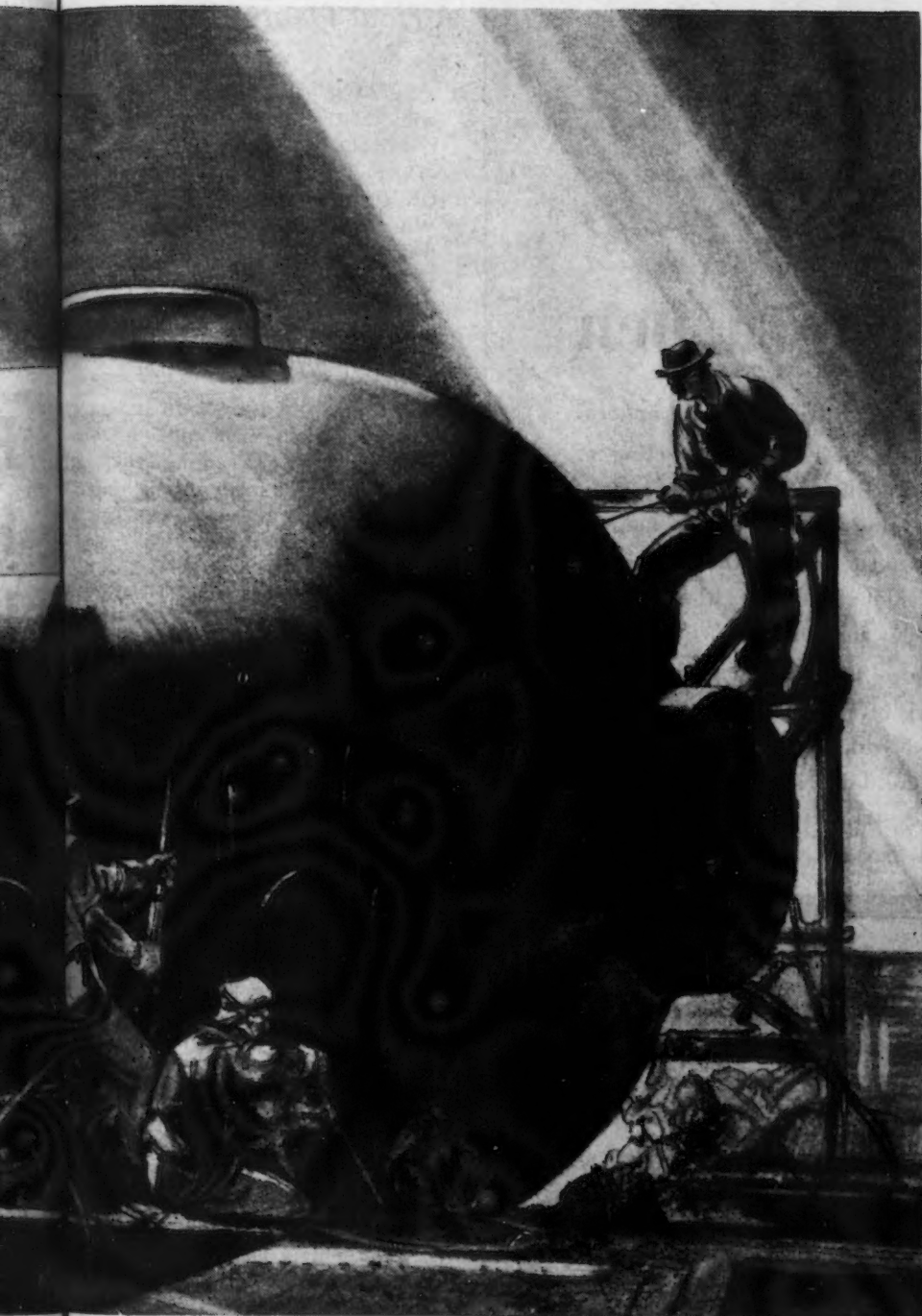
COPYRIGHT 1943—JONES & LAUGHLIN STEEL CORPORATION

STRONG STEEL—THE METAL BY WHICH

Gouged, hammered, pried from its mold of sand and gagger-bars, this mammoth one-piece casting of war-steel emerges in a form of massive strength to do a job on the production front as no other material could do it. A product of the art and skill of J&L foundrymen, this casting, a hydraulic cylinder, is the heart of power for a gigantic extrusion press. Strong steel in this and other castings, weighing up to 280,000 pounds, enables the giant mechanical presses to exert pressures so great as to squeeze aluminum, cop-

per, brass and other metals, as well as certain steels, through small die openings like a pastry cook extrudes cake-icing through the tip of a pastry cone. By this extruding process these other metals are formed into hundreds of parts for aircraft engines, flying instruments and airplane assemblies as well as parts for weapons and other fighting equipment.

Thus steel—strong steel—which is being produced at the rate of 90 million tons a year, is doing two war jobs. First: steel is serving on the



FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

OTHER METALS FLY AND FIGHT

invasion fronts in the form of tanks, guns, ships, planes, ammunition and other military supplies, and second: it is serving on the production front in the form of machines, large and powerful, small and intricate, that shape other metals and materials including plastics and certain steels into equipment and arms for victory.

ALIQUIPPA WORKS



PITTSBURGH WORKS

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

CONTROLLED QUALITY STEEL FOR WAR



CAST STEEL

"Ten cats couldn't catch a rat in that mold," is way steel foundrymen express complex maze of slits, slots, holes, channels, passages, partitions, grooves, gutters and criss-cross tunnels that make up molds in which steel castings for extrusion presses are poured, such as illustrated here.

110 army tanks on a man's back, if he could carry them, would create pressure on his feet equivalent to the force developed by an extrusion press plunger, 160,000 pounds or 80 tons per square inch, in forming airplane parts of aluminum and other metals.

More than 3 Weeks Cooling off period is allowed large steel castings after they have been poured at J&L Otis Works, Cleveland. Molds are constructed in a hole in the ground big enough for basement of a dwelling. Molds are made up with core sections fitted together like a three-dimensional jig-saw puzzle. Approximately 13 weeks are required from start of mold to finished casting, several weeks of which are required for properly drying mold and allowing cast molten steel to become solid and to cool off in the ground.

"One who plays jokes," is dictionary definition for word "gagger", but as used in advertisement at left the definition that applies is — "a piece of iron used in a mold to keep the sand or core in place."

Your invasion dollars, invested in securities of the Third War Loan, will help push our invading forces deeper into enemy territory and hasten end of War.

110 hours with Jap bullet hole in its Wright Cyclone engine valve stem, is record performance of a Curtiss Mohawk 75-A fighter, Thompson Products, Inc. reports. The .25-caliber Jap missile drilled a 1/4-inch hole through the Thompson sodium-cooled valve. This was unknown to pilot, who was in the dog fight. The valve, discovered during a routine engine overhaul, was still in sound condition after an estimated 30,000 air miles.

Plasma, surgery and sulpha drugs account for saving lives of more U. S. soldiers in evacuation hospitals during the African campaign than were ever saved by any army at any time. Death rate in this campaign was between 2 1/2% and 3% of those wounded, according to Major-General Norman Thomas Kirk, surgeon-general, U. S. Army. During first World War, General Kirk said, mortality rate was 15%. Blood plasma, contributed by American public, the "cream of American surgery" stationed at front line hospitals, and use of the new sulpha drugs to control infection, if it sets in, account for the splendid record in this war, the surgeon-general stated. One of the chief sources of sulpha drugs is the by-product coke ovens of the steel industry.



A week ago **he was pushing a pen**

Today Bill is one of industry's production line workers.

Using a Stanley Electric Drill he quickly got a feeling of confidence in his own ability. The fine balance, light weight and unique safety devices of Stanley Electric Tools make it easy to turn out good work. As a worker continues with his Stanley Drill, Unishear, Saw or Grinder and learns how accurate and dependable it is, his proficiency increases.

Stanley Electric Tools are making it easier for thousands of fellows like Bill . . . and hundreds of employers, like you, who are faced with the "inexperienced-worker" problem today. We are proud of the work our tools are doing in the hands of men and women who are new to industry. Stanley Electric Tool Division, The Stanley Works, New Britain, Connecticut.

1843

STANLEY

1943

TRADE MARK

HAMMERS

UNISHEARS

SAWS

A Heat Treater Looks At Tool Design

(CONCLUDED FROM PAGE 45)

will withstand the hardening treatment required.

2. Select steels that not only are OK for the work to be done, but will produce the physicals required when treated.

3. Choose the right treatment, remembering that there is a big difference between hardening for hardness and heat treating for toughness.

4. Remove at least 1/16 in. from all sides when machining. Avoid strains caused by hogging. Enough mistakes can be made in machining without taking these precautions.

5. Inform the hardener fully, and above all correctly, at the start, as to the kind of steel. In case hardening, he should know the depth desired, and whether to leave the job soft or harden it.

6. Inform the hardener as to the use or purpose of the tool or part.

7. Supply test pieces which bear some semblance in size and shape, as well as analysis, to the job it represents.

8. In the case of forgings, rough machine and then both normalize and anneal before machining to size.

9. Make sure that the hardener has sufficient, suitable modern equipment.

10. Ascertain whether the hardener has the degree of experience and skill which insure the best results.

11. Make sure that no new process is overlooked that would do the job better.

12. Avoid the pitfalls that lie in straightening, blasting, tumbling and pickling delicate tools. For example, if selective hardening can be used, no straightening may be required, and so on.

13. Finish grind carefully to avoid heat-checking.

14. Specify correct rakes, every time.

15. Grind soon enough.

16. Use correct speeds and feeds.

17. Consider condition of the raw material. Will it pay to normalize or anneal it, rather than waste tools?

18. Where tools work harden, try re-drawing. It may help a lot.

19. Finally, don't overlook reclamation.

Until these pointers are consistently observed, I fear we must be satisfied with 25 per cent of effective tool usage.

Information Free

(1) Screw Threading Tools:

Pocket size catalog #22 contains complete tables of screw thread information on standardization of design, dimensions, tolerances, drill sizes, etc. The line of Butterfield taps, dies, screw plates, tap wrenches and reamers is also illustrated and described. *Butterfield Div. of Union Twist Drill Co.*

(2) Idea Stimulator:

New data service in loose leaf form entitled "Practical Design for Arc Welding" is replete with time saving suggestions for economical design of changeovers or new products. Based on practical experience in many industries, it coordinates the elements of design, available materials, and available equipment for handling and preparing the materials. The first section of this new service is now being released to a selected list of firms and individual executives who can make the best possible use of the new ideas for the benefit of their business. *The Hobart Bros.*

(3) Grinding Wheels:

Catalog contains illustrations of standard wheel types and shapes of grinding wheel faces. Also gives information, specifications and prices on standard and special wheels in the various types of bonds. *Vitrified Wheel Co.*

(4) Colloidal Graphite:

4-page illustrated bulletin, No. 431-WW, on "dag" colloidal graphite for impregnation and surface coatings. Detailed discussion of the impregnating capacity of colloidal graphite dispersions and application and results of impregnation and surface coating of colloidal graphite for various industrial products. Includes reasons for colloidalization of graphite for this purpose and notes on methods used to impregnate materials. *Acheson Colloids Corp.*

(5) Karweit Driller:

Folder illustrates ways in which Karweit driller remedies many difficulties experienced in drilling any machinable material, such as metal and plastics. Discusses conventional drilling as compared with drilling done with this basic improvement. *The Bastian-Blessing Co.*

(6) Balancing Machines:

Complete line of type E-O Static-Dynamic Balancing Machines, both horizontal and vertical, is described in 24-page booklet. Principle of operation, construction, specifications and other engineering details essential to a thorough understanding of the application of these balancing machines are included. *Tinius Olsen Testing Machine Co.*

(7) Steel Castings:

36-page illustrated bulletin No. 801 describes facilities for complete repair and replacement service in production of electric furnace steel castings. Characteristics and details of carbon-steel, alloy steel, iron and non-ferrous castings, as well as machining, heat treating, forging and fabrication services are described. *The Elmco Corp.*

(8) Tubular Piping:

64-page illustrated book covers the various ways in which piping can be used and lists present market prices for every conceivable kind and size of fabricated piping. Shows pictures of some of the 154 machines of various types which are used in bending and cutting pipe to any size or outline. *The Flori Pipe Co.*

(9) Servicing Overhead Cranes:

Handy pocket-size manual for men in charge of servicing overhead traveling cranes is arranged in simple question and answer form and indexed for quick reference. Under each question pertaining to certain troubles are listed the probable contributing conditions which should be inspected and remedied to stop the trouble at its source. In addition, the "Trouble Shooter" contains complete lubrication charts, standard crane operating signals, sample inspection report, operating cautions, and a schedule on safe listing of loads with chain, wire rope, manila rope, and sisal rope slings. *The Harnischfeger Corp.*

(10) Carbide Die Servicing:

20-page booklet, No. D-115, gives outline of free training courses in carbide die servicing, which are available to selected individuals in any mill using cemented carbide dies. Courses, which are actual shop training periods, are so arranged that training of any individual can be confined to the specific problems encountered on products produced in his own mill. *Carboloy Co., Inc.*

(11) Quenching Oil:

Brochure contains 16 pages of detailed information on the properties and advantages of Gulf Super-Quench, the revolutionary new dual-action quenching oil produced for use in the heat treatment of many types of steel in the manufacture of war material. *Gulf Oil Corp.*

(12) Tapped Hole Sizes:

Useful 16-page booklet has tables showing pitch diameter limits of standard hand taps, pitch diameter of nuts and tapped holes for various class fits. Also information on recommended class fits and tap sizes for same. Tap drill sizes are given as well as three-wire measurement data on screw thread pitch diameters. *Winter Brothers Company.*

(13) Babbitter:

Folder describes Big Chief Babbitter, for melting and casting babbitt to line or reline bearings. Gives instructions for operating and stresses precautions to be taken. Also gives some helpful hints on babbitting. *United American Metals Corp.*

(14) Drilling Machine:

Circular No. 743 describes deep hole drilling machine in the duplex and single speed models, equipped both for hydraulic feed or mechanical feed. Illustrates machines from various angles and shows floor plan for Model No. 1 1/2. *Morey Machinery Co., Inc.*

(15) Spark Testing Guide:

Guide for spark testing tool steels is in the form of a 21 x 30 in. wall chart, and is useful in segregating tool steel scrap, unscrambling mixed stocks and checking the identity of tool steel before heat treatment. Describes and illustrates spark patterns caused by various alloying elements in tool steel and gives complete details on the fundamentals of spark testing. *The Carpenter Steel Co.*

(16) Grinding Machines:

1943 edition of "Modern Methods of Gardner-Grinding" illustrates operations of finish-grinding the stem end of valves, double-disc grinding, massive 30 in. single spindle grinder, precision disc grinding, grinding both ends of large coil springs simultaneously, snagging of V-8 cylinder blocks, hand-operated disc grinding, double spindle grinder, etc. *Gardner Machine Co.*

(17) Magnet Operator's Chart:

Operating and maintenance tips for lifting magnet operators on 8 x 20 in. card to be hung in the magnet crane cab. Thirteen suggestions proved by experts tell just what to do and what not to do in clear, simple language and graphic pictures. *Cutler-Hammer, Inc.*

(18) File Systems:

"Systems" is the name of the company's house organ, which is published monthly. This issue is a report on the use of Administrative Control systems by industrial, commercial and government organizations throughout the Mid-Atlantic area and tells the story of how Remington Rand systems and equipment are contributing to the vast production effort throughout this area. *Remington Rand, Inc.*

(19) Arbor Presses:

Catalog No. 39 describes and illustrates hydraulic and hand operated arbor presses. Gives specifications for each and current prices. *Greenerd-Arbor Press Co.*

NOTICE TO READERS: Your request for this information will be forwarded promptly to the manufacturer issuing the literature, and the offer is good for only two months.

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(20) Milling Machines:

Folder tells how to save wasted man hours and increase production by use of Multi-Versal machines, listing some of the many reciprocating and rotary cutting operations that can be performed. *Hack Machine Co.*

(21) Paging Systems:

"Tell It to Sweeney" is the title of a short-cut story which describes how a paging system can speed up a whole production program by "straight line" communication with any point in the plant. *Stromberg-Carlson, Telephone Mfg. Co.*

(22) Milling Cutters:

Catalog #26 presents 22 pages of information and illustrations of inserted tooth milling cutters. These include plain, side, face, deep slotting and special milling cutters. Multiple cutter boring heads and special counterboring tools are also featured. *Lovejoy Tool Company, Inc.*

(23) Industrial Resins:

Discusses industrial resins as applied to grinding wheels, mineral wool batt insulation, resistance units, casting resin, brush bristle bond, brake linings, sealing porous castings, core binder, cements, laminated material, molding compounds and other applications. Another booklet discusses molding compounds and oil soluble resins. *Durez Plastics & Chemicals, Inc.*

(24) Production Lathe:

Folder describes and illustrates the multi-tool production lathes, whose unit design provides for a wide range and variety of slides, overarms and similar attachments, both regular and special, any of which may be quickly mounted in any combination on the single universal base. Also lists special equipment which is available for applications on shells, shafts, drill reamer blanks, gears and bevel gears, commutators, rotors, fittings, valves, valve guides, test pieces, pistons, cylinders, cylinder liners, crankshafts and bushes. *Smallpeice, Ltd.*

(25) Centrifugal Casting Machine:

Folder describes the Model J vertical centrifugal casting machine for production of ferrous and non-ferrous castings. The machine is completely integrated on a single base so that it can be readily moved as a unit. For permanent installation it may be bolted to the foundation through holes provided in the base. The machine is ideal for permanent mold centrifugal casting of bushings with dimensions such that the length of the bushing does not appreciably exceed the diameter. *The Centrifugal Casting Machine Co.*

(26) Metal Parts Cleaner:

Folder illustrates the Soaker-Hydro and Simplex metal parts cleaners for the positive removal of dirt, chips, grease, oil, etc., and preparing of parts for the next operation by the original design of "Active-Soak" and "Powerful Washes." Also describes the Simplex Junior for the tool room or department that requires a small compact metal parts cleaner. *Sturdy-Bilt Equipment Corp.*

(27) Electric Furnace:

Bulletin HD 643 deals with protective combusted atmosphere in furnaces, and illustrates the curtain type furnace, gas preparation unit and gas cracking unit, together with a typical atmosphere piping diagram. *Hevi-Duty Electric Co.*

(28) Rotary Pumps:

Catalog 943 contains pertinent information concerning Roper rotary pumps, which have only two moving parts, equal size pumping gears operating in a case with just enough clearance to prevent wear. The action of the gears produces a vacuum which draws the liquid into the suction opening. From there it is carried between the teeth of the gears to the opposite side of the pump where the gear teeth mesh, forcing liquid into discharge line. *Geo. D. Roper Corp.*

(29) Metal Washing Machine:

4-page illustrated booklet, Bulletin No. 19, describes the Tabl-Spray metal washing machine for high-speed washing of flat, fragile work or circular parts with intricate pockets and crevices. Operating sequences, mechanical features, construction specifications and details are covered. Schematic drawings and diagrams illustrate the spray cleaning action. Brief description of the extensive metal cleaning laboratory is included. *American Foundry Equipment Co.*

(30) Gage Blocks:

4-page reprint entitled "The Use of Gage Blocks" illustrates and describes numerous uses of these standards of measurements as they are employed daily in both inspection departments and machine shops. *George Scherr Co.*

(31) Pneumatic Vises:

Folders are concerned with the Airlox, a compact quick-acting pneumatic vise for light precision production, operated by a special Schrader air cylinder. Specifications for the Midget, Junior and Senior models are given. *Production Devices, Inc.*

(32) Preventing Skin Trouble:

Intended for posting in washrooms and on bulletin boards, a card printed in striking red on white offers seven tips on the protection of the skin. Available to plant superintendents and shop foremen. *Quaker Chemical Products Corp.*

(33) Wire Baskets:

Folder illustrates wire baskets for heavy duty or light loads, for large or small objects, for handling large loads, dipping and cleaning, annealing, drying, and other operations. Each basket order is a specially tailored job produced with maximum care to conform accurately with the customer's specifications. Another folder deals with Buff-Aloy abrasive resistant wire cloth or stone, sand, gravel and abrasive industries. *Buffalo Wire Works Co.*

(34) Oil Hydraulics:

Folder pictures the range of hydraulic units manufactured by the company and the diversified types of equipment to which hydraulics are being applied. *The Dennison Engineering Co.*

(35) Rotary Finishing Machine:

Bulletin No. 401 describes the high-production 6 and 8 (work holding) spin-

die rotary table automatics. Detailed information, shown photographically, gives various combinations of relatively standard units and their extreme flexibility. Also gives construction features and a complete table of specifications tabulated for ready reference. *Hammond Machinery Builders, Inc.*

(36) Rotary Shear:

Folder deals with rotary shears, clamp and pin circle cutters, flanging attachments and joggling or off-setting attachment. The shears are all-purpose machines designed for modern, high speed production. *Kling Bros. Engineering Works.*

(37) Cutting Torches:

Bulletin discusses main points to consider when choosing welding and cutting torches, and gives torch and tip chart. Also described arc outfits for welding and cutting, production welding, sheetmetal welding and cutting, heating and soldering, lead burning and accessories. *National Cylinder Gas Co.*

(38) Portable Degreasers:

Bulletin describes and illustrates portable electric vapor degreasers, degreaser controls, portable electric stills, and Phillsolv, the corrosion-resistant efficient cleaning solvent. Graphs average operations at normal breathing level, relative evaporation rates of organic solvents, concentrations of chlorinated hydrocarbons at various levels, and cost of power in dollars per k.w.hr. *Phillips Mfg. Co.*

(39) Precision Cutting Tools:

Folder deals with special precision cutting tools, with photographs of some typical tools in actual operation. Listed are reamers, gun drills, counter bores, end mills, profile cutters, hollow mills, countersinks, milling cutters, tapered reamers, shaving tools, recessing tools, interlocking cutters, carbide-tipped tools and form relieved cutters. *C & W Tool Co.*

(40) Filtered Air:

Folder discusses how the health of hot metal crane operators can be protected through the use of the Aire-Rectifier for foundries, mills and forge shops, in processing steel, copper, aluminum and other metals. *The Lintern Corp.*

(41) Industrial Furnaces:

Folder describes and illustrates semi-muffle and pit-type furnaces, both oil and gas fired. Also illustrates recirculating melting, continuous heat treating and car type furnaces. *Dempsey Industrial Furnace Corp.*

(42) Metal Cutting Methods:

71-page pocket-size booklet deals with inserted tooth metal saws, metal saw grinders, solid tooth circular saws for cutting metal, brass saws for cutting brass, copper and aluminum, plastic cutting saws for cutting all types of plastics, fiber and similar materials, tungsten carbide fitted saws for cutting plastic materials (with abrasive binder), metal slitting saws, screw slotters, tungsten shears for thin metals, electrotypes saws and rotary shears. Also lists metal cutting bandsaw blades, hacksaws, files, abrasive grinding wheels and tool bits. *Simonds Saw & Steel Co.*

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EC&M Spring-Loaded Magnetic Contactors *"met the situation"*

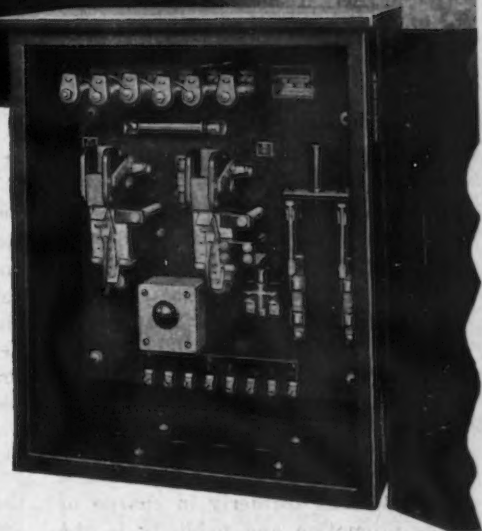


Official U. S. Navy photograph

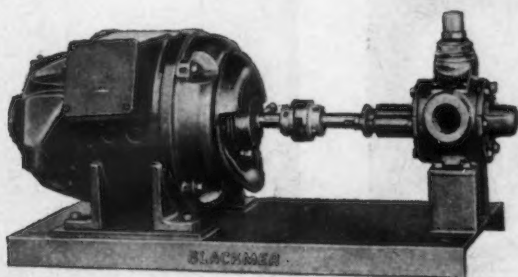
The Government needed magnetic starters for auxiliary pumps on mine-sweepers—starters to withstand the rolling and pitching of these small craft on heavy seas—starters so designed that accidental closing could not happen under these conditions.

EC&M had a commercially proven, spring-loaded contactor of proper size—one which was held in the "open position" by a spring. The need was urgent—EC&M quickly designed starters to "meet the situation."

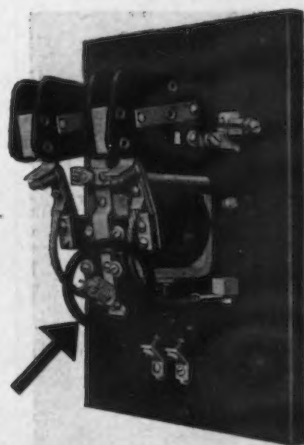
On many phases of the war effort, EC&M Contactor Control is giving a splendid account of itself on vital projects of extreme interest. Some day, perhaps, the story can be told.



Typical EC&M D-c Starter with single-pole, spring-loaded contactors, front-connected resistors and drip-proof cabinet.



Blackmer pump unit of the type used for naval auxiliaries.



Showing location of spring on EC&M 50-ampere Contactor of double-pole design.



THE ELECTRIC CONTROLLER & MFG. CO.
2700 EAST 79th STREET * CLEVELAND 4, OHIO

PERSONALS

• **Robert G. Glass** has been appointed vice-president and manager of operations of Geneva Steel Co., U. S. Steel Corp. subsidiary, Provo, Utah. He will also be a director of the company. Mr. Glass has been associated with U. S. Steel subsidiaries for 31 years, becoming assistant to the manager of operations of Carnegie-Illinois Steel Corp. in the Chicago district in 1936, and in 1941 achieving promotion to the rank of assistant manager of operations, Chicago district.

• **R. C. Cosgrove**, vice-president and general manager, manufacturing division, the Crosley Corp., Cincinnati, has been made chairman of a new post-war committee of the Radio Manufacturer's Association.

• **B. F. Ilsley** has been made assistant manager of the newly formed works section of the Wire and Cable Division, General Electric Co., at Oakland, Cal. He was formerly assistant superintendent and magnet wire specialist of the wire and cable section. At the same time the appointments of **J. S. Overstreet** and **J. J. Curtin** as assistant manager of sales for the cable section at Schenectady, and assistant manager of sales for the magnet wire section at Fort Wayne, respectively, were made. Mr. Overstreet was formerly commercial cable representative for the company's Bridgeport works. Mr. Curtin joined GE in 1920 and was formerly in charge of sales promotion and publicity in the motor division.



ROBERT G. GLASS, vice-president and manager of operations, Geneva Steel Co., U. S. Steel Corp. subsidiary, Provo, Utah.

• **Fred W. Pennington**, until recently in the publicity department of the Westinghouse Air Brake Co., has been appointed manager of publications and advertising for Kennametal Inc., at Latrobe, Pa. Mr. Pennington's background of experience includes engineering, commercial engineering, technical writing, and the preparation of sales literatures and business paper advertising.

• **Robert H. McCracken** has been appointed manager of combined sales of the Boston office of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc. Mr. Mc-

Cracken was formerly associated with Central Iron & Steel Co., where he served for eighteen years as Philadelphia district sales manager and, for the past two years, as assistant general sales manager at the home office in Harrisburg.

• **B. M. Horter** has been appointed new purchasing head for Cutler-Hammer, Inc., Milwaukee, manufacturers of motor control apparatus. **F. S. Wilhoit**, former purchasing head, has retired after 41 years of service with the company.

• **I. T. O'Brien**, general production manager of Chrysler Corp., has been appointed special representative on the staff of the general manager, to assist in executive management of the corporation. **H. J. Dunn**, formerly assistant to Mr. O'Brien, was appointed general production manager. **W. A. Stickle**, former supervisor of the central routing department, was named assistant general production manager.

• **Delos M. Palmer**, dean of engineering at the University of Toledo since 1934, has been appointed plant engineer at the American Propeller Corp. subsidiary of the Aviation Corp., Toledo.

• **J. W. Burdick** has been appointed assistant district manager of Allegheny Ludlum Steel Corp. at Springfield, Mass., while **J. W. Purtell** was named salesman for that district.

• **R. C. Griffith** has been appointed manager of the engineering and research department of the Denison Engineering Co., Columbus, Ohio.



J. S. OVERSTREET, assistant manager of sales for the cable section at General Electric Co., Schenectady.



B. F. ILSLEY, assistant manager of the works section of the Wire and Cable Division, Oakland, Cal., plant, General Electric Co.



J. J. CURTIN, assistant manager of sales for the magnet wire section at Fort Wayne plant of General Electric Co.

• **Harry E. Bell** has been appointed general sales manager for the American Steel Wool Mfg. Co., Inc., Long Island City, New York. Mr. Bell formerly directed the sales of the company's household products.

• **Elmer C. Cook** and **Fred J. Schweizer**, formerly sales manager and service engineer, respectively, of the American Gas Furnace Co., Elizabeth, N. J., have resigned to form the Cook-Schweizer Co., Elizabeth, N. J., to do commercial heat treating.

• **E. J. Goes**, advertising manager for the Koehring Corp., Milwaukee, has been elected president of the newly organized Editors' Association of Milwaukee, comprising industrial officials interested in house organ work and promotion. **Van B. Hooper**, advertising manager of the Louis Allis Co. is vice-president; **Dorothy Ackeret**, Pressed Steel Tank Co., secretary; **Charles Petri**, Falk Corp., treasurer, and **John Moravec, Jr.**, Bucyrus-Erie Corp., director.

• **Albert G. DeGraff** has been named resident manager of the Austin Co. in Philadelphia. Mr. DeGraff joined the Austin Co. in 1930, and, after serving as an estimator in its Cleveland and Chicago districts, was transferred to the New York district in 1936, during which time he was associated in the design and construction of many industrial plants in that area. Mr. DeGraff succeeds **J. C. Childs** who retired Aug. 1 after 26 years of service with the company.

George M. Gillen, who has been in charge of advertising and sales promotion for Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., since 1935, has been appointed assistant manager of combined sales of Lukens Steel Co. and subsidiaries. Prior to joining the Lukens organization in January 1935, Mr. Gillen handled the advertising of Lukens Steel Co. and subsidiaries, as an account executive with the G. M. Basford Co., New York.

Mr. Gillen is a member of the American Iron and Steel Institute, the Industrial Advertising Association of New York, the National Industrial Advertisers Association, the House Magazine Institute, and the Uptown Club of New York.

• **Douglas C. Turnbull, Jr.** has been made executive assistant of the Baltimore & Ohio Railroad Co. Mr. Turnbull was formerly manager of the general service and public relations departments of the Consolidated Gas & Electric Co., Baltimore.



HARRY E. BELL, general sales manager for the American Steel Wool Mfg. Co., Long Island City, New York.

• **Frank E. Farrell** has been appointed manager of the Detroit office of Howell Electric Motors Co., Detroit. Formerly sales promotion manager, he succeeds **A. A. Rutter**, who has resigned.

• **W. H. Steinkamp** has been appointed assistant general sales manager of the Brown Instrument Co., Philadelphia, a division of Minneapolis-Honeywell Regulator Co. During the past 13 years Mr. Steinkamp represented the company in New York, Buffalo, Cleveland and Pittsburgh, where he served as branch manager.

• **Armin L. Nevers** has been appointed by the Osborn Mfg. Co., Cleveland, as technical representative in Wisconsin.

• **Carl O. Voltz** formerly connected with the Columbia Tool Steel Co. has joined the sales department of Ziv Steel & Wire Co., Chicago.

• **Gray H. Bernard**, formerly manager of the flying boat division of Nash-Kelvinator Corp., has been named works manager of Eureka Vacuum Cleaner Co., Detroit.

• **Gwilym A. Price**, president of the Peoples-Pittsburgh Trust Co. since 1940, has resigned his presidency to become a vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh. He will continue as a member of the board of directors of the trust company.

• **Walter Geist**, Allis-Chalmers president, has resigned from the regional management-labor committee of the WMC. His place on the committee

is being taken by **Lee H. Hill**, vice-president in charge of industrial relations at Allis-Chalmers.

• **R. D. Mudd**, former field representative for the Laclede Steel Co., St. Louis, has joined the Fruin-Colnon Construction Co., St. Louis, as assistant to the president.

• **Richard L. Kopp**, formerly affiliated with the pipe sales department, Republic Steel Corp., Cleveland and Youngstown, has recently joined the sales division of the Sawhill Mfg. Co., Sharon, Pa.

• **W. B. Rose** has been appointed advertising manager for the PEMCO Co., Baltimore. Mr. Rose was formerly advertising manager for the *Philadelphia Evening Ledger*, and associated with the national advertising department of the *Philadelphia Record*. **O. L. Davis** has been made purchasing agent for the company. He was formerly general purchasing agent of the Air Track Mfg. Co.

• **Robert W. Owen** has been appointed metal process engineer for the Quaker Chemical Products Corp., Conshohocken, Pa. He will cover the eastern Pennsylvania, Maryland and Delaware territory.

OBITUARY...

• **Franklin H. Dewey**, vice-president of Gar Wood Industries, Inc., Detroit, died Sept. 9. Mr. Dewey was with Gar Wood for over 20 years.

• **Francis L. Beaupre**, General Motors body engineer for the past 25 years, died recently.

• **Charles E. Magill**, manager of the extrusion and architectural products division of the Aluminum Co. of America, Pittsburgh, died Sept. 8. He was 50 years of age, and had been with the company 26 years.

• **John E. Shearer**, superintendent of the Penn Metal Co., Inc., Parkersburg, W. Va., died Sept. 3. He had been associated with the company, for 13 years. Prior to that he was superintendent of the Northwestern Expanded Metal Co., at Jeannette, Pa. He was 55 years old.

• **Allan G. Ramsay**, chief engineer and vice-president of the Austin Co., building contractors, died at Detroit, Sept. 11. He was 67 years old.

• **Mahlon E. Simpson**, chairman of the Resources Protection Board, WPB, died Sept. 7. Mr. Simpson had also served as assistant deputy vice-chairman for production under H. G. Batcheller and as vice-chairman of the Industrial Facility Committee.

Tool Builders Speak on Renegotiation

Washington

• • • Because the cyclical character of the machine tool and heavy machinery industries practically guarantees them a unique individual depression after the war, members of the House Ways and Means Committee have recently said they were sympathetic toward industry requests for substantial post-war reserves.

Observers say that a deep impression has been made by industry statements that there are now more than enough tools and machinery to satisfy civilian demand for the next 15 years. The combination of renegotiation, taxes and over production for war use with the consequent slack market threaten these industries with extinction.

Walter Harnischfeger, president of the Harnischfeger Corp. Milwaukee, told the committee in its renegotiation hearings last week that under the Renegotiation Act the question of life or death of industry is in the hands of a board of five men "who know nothing about an industry problem of this type."

Mr. Harnischfeger called for repeal of the Renegotiation Act or at least uniformity in the rules of the game. He said:

"In our case, we were informed that the formula which was used was the same as accepted by one of our competitors. In the meantime, we found out that two of our competitors got better offers.

"In other words, I get one kind of settlement, a competitor gets another type of settlement, and the result is that in my opinion they are asking me to gamble. I am not a gambler; I am a manufacturer.

"Not only that, but so far as I am concerned, I do not want to become the richest man in the cemetery. I do not eat this money, but I do have to have money to employ people.

"What I mean is you cannot run a business without having working capital, and in a business of this type there are large investments. In other words, our reverse cycle works just as rapidly. When we do not have our total volume, and cannot get our total volume, we go into reverse on losses as rapidly as we go up on

profits; and of course it is impossible to generate heavy equipment business. I cannot go out and promote that type of business as I would some smaller article that is sold to the consumer."

For every \$10 in taxes paid, Mr. Harnischfeger said, his company retained \$1.45 net, and will pay \$10,000,000 in taxes this year. In addition, renegotiators are asking for \$6,000,000.

Mr. Harnischfeger asserted that the recapture of the \$6,000,000 cuts his company's gross profit in half, and reduces a \$2,000,000 surplus by one half. He said that the company's surplus in 1929 was \$3,000,000 and at the end of 1943 was \$2,000,000 and that this working capital is not adequate to the post-war markets confronting the company.

"This country was built on the theory of free enterprise, and if the capitalistic system is to survive, certainly there is no one better knowing

News stories on renegotiation appear on pages 90 and 92. A story on idle tools will be found on page 94.

the cyclical problem than those engaged in it," the heavy machinery manufacturer said. "Our renegotiation is adjudicated by a board consisting of men who know nothing about an industry problem of this type."

Summing up the need for adequate reserves Mr. Harnischfeger showed that his industry requires tremendous investments in equipment to produce heavy machinery. He estimated that from \$8000 to \$12,000 per man is required in the way of capital equipment.

"If the government is not far sighted enough to keep an industry of this type from deteriorating," Mr. Harnischfeger continued, "it would be necessary for them to maintain equipment of this nature and an organization of this type at the expense of the government to be in readiness for future emergencies." This would amount to some form of state socialism, Mr. Harnischfeger said.

With respect to post-war employment and the need for adequate reserves for research, Mr. Harnischfeger

reported that his company is employing 1500 men on the crane business alone, but by Jan. 1 only 20 per cent of that number would be engaged in that operation. He predicted that it would be impossible to maintain a reasonable number of men on the pay roll, if funds were lacking "so that we can take some chances in developing new lines."

During the last depression, the Harnischfeger Corp. developed welders and electrodes which required an investment of \$500,000 before "we got in the black." It was also revealed that the company invested \$1,000,000 in one department to manufacture pre-fabricated houses before any profit was made.

In lieu of renegotiation, Mr. Harnischfeger proposed a higher excess profits tax. Because the tax affords a business man some degree of certainty in knowing how he is going to be treated by the government. He declared that the Renegotiation Act is un-American and if it were adjudicated by the type of Supreme Court under which this country grew, he questioned whether it would be declared unconstitutional.

Mr. Harnischfeger scored the high pressure methods utilized to make the law effective and the duress employed by certain Army and Navy officials who threatened to withhold contracts as a method of persuasion.

Later in the week, Thorvald S. Ross, president of the Rivett Lathe and Grinder Co., Boston, and Charles N. Safford, treasurer of the Lovejoy Tool Co., of Springfield, Vt., told the committee much the same story.

Mr. Ross contributed as a note of comedy, a six foot procurement form printed on both sides, which he had been requested to fill out and return to one government agency. Some of the questions the form asked were, "What kind of a union do you have?", and "Do you get along well with the union?"

When Mr. Ross was asked if the machine tool industry should get a bigger allowance than others, he replied that if the industry were not allowed to keep necessary reserves, the United States would lose the next war. Mr. Ross said that without reserves the machine tool industry could not survive.



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NON-FERROUS METALS

... News and Market Activities

Copper Alloy Conservation Chart Revamped

... A new edition of the Conservation Chart for Brass and Bronze Castings was issued Sept. 13 by the Conservation Division of WPB. It has been prepared to guide engineers and designers in specifying less critical grades of material. This chart replaces the Down-Grading Chart issued by the division in January. The use of the new substitution chart for conservation in brass and bronze castings by specifications change is explained by Carter S. Cole, chief of the Metals Branch of the Conservation Division as follows:

"Real conservation, where copper alloys are necessary because of engineering requirements, can be effected by specification changes based on a critical examination of end use. The primary objective of this work is a better utilization of available material for maximum efficiency in the war effort. Such changes are the designing engineer's responsibility. The accompanying chart can serve as his guide and the table below it gives a ready cross-reference to the applicable approximately equivalent specifications.

"Since the publication of the original chart in January, the material supply situation has changed. Today, tin-bearing copper-base alloy scrap is much less readily available. On the other hand, fired cartridge cases are being returned from the battlefields in quantities in excess of that which can be readily used by the brass mills. These make excellent material for the ingot maker in compounding regular manganese bronze.

"Consequently, in this reissue of the chart, emphasis is placed on the desirability of changes into manganese bronze and yellow brass and less emphasis is placed on the changes into the secondary tin-bearing copper-base alloys.

"The title of the chart has been changed from Down-Grading to Conservation to emphasize the fact that it illustrates the true definition of conservation—namely the effective use of our materials and resources. Actually, some of the properties of the alloys suggested as substitution are superior to those of the alloys that they can replace. Manganese bronze, for instance, is a higher strength alloy than Composition "G" or "M." It does not,

however, have the same properties as a bearing metal, or the same resistance to certain types of corrosion, nor is it useful for intricate pressure castings.

"As before, the chart shows the important specifications grouped in columns according to the material required by an ingot maker or foundryman. Four classifications are given—All New Metal includes No. 1 and No. 2 copper, as well as electrolytic; High Purity Scrap, as noted, is exemplified by such items as fired cartridge cases; the Selected Scrap Plus Tin indicates the segregated tin-bearing scrap which requires tin sweetening to bring it up to specification requirements; the Scrap column designates those alloys which can generally be made from obsolescent and process scrap which has not been too carefully segregated."

Pig Tin Schedule Revised

... OPA's tin schedule has been revised to meet current requirements. Maximum Price Regulation No. 17 (Tin) went into effect Sept. 23 with no major changes made in ceiling prices. Pricing, however, is simplified by certain textual and procedural recasting.

The maximum price of Grade A pig tin remains the same at 52c. a lb., ex dock port of entry or f.o.b. producer's plant. Grade A tin is metal with a minimum tin content of 99.8 per cent, meeting Treasury specifications as to maximum impurities. However, the following brands now are specifically listed in the regulation as qualifying for the Grade A price:

Chempur, Pyrmont, Straits Trading, O. T. Lampriere & Co., E. S. Coy (Penang), Billiton, Mellanear (guaranteed 99.9 per cent), Hawthorne Refined, Banka, Katanga, Longhorn 3 Star, M & T No. 1, M & T Electrolytic Refined, Vulcan American Refined and Vulcan Electrolytic.

The new maximum price for the new Longhorn 2 Star grade produced at MRC's new Texas City smelter, OPA said, is 51.5c. a lb., f.o.b. producer's plant. Longhorn 2 Star has a minimum tin content of 99.5 per cent, and is expected to replace Grade A tin in certain kinds of industrial consumption.

The maximum price for Grade B tin now is established at 51.875c. a lb., ex dock port of entry or f.o.b. producer's

plant or 0.25c. above the previous ceiling price. Grade B tin is listed as metal with a minimum tin content of 99.8 per cent as previously but now in addition metal qualifying for the B price must have an arsenic content no greater than 0.05 per cent. Heretofore, Grade B arsenic content was not restricted.

A new provision has been added to the new regulation establishing maximum prices for less-than-carload lots of 5 to 10 tons sold by MRC from inland warehouses. On such sales, Metals Reserve may charge the base price plus less-than-carload freight from New York to warehouse, less freight delivery allowances made by railroads to a customer who picks up his own freight at the terminal.

Maximum prices for tin oxides, previously priced under the General Maximum Price Regulation, have been written into the new regulation and are about the same as those provided by the general regulation.

Sabotage Trial Begins

Cleveland

... The first trial of defendants charged with sabotage by the United States Government opened this week in Cleveland against officials of the National Bronze & Aluminum Foundry Co., in Federal Court. Jurors were chosen in record time of about 3 hrs. and the case for the Government was presented by U. S. District Attorney Don C. Miller.

The defendants, John L. Schmeller, former president of the company, his brothers, Frank and Edward Schmeller, for subordinate executives; James Helm, former plant superintendent; Otto M. St. John, former service engineer; Robert W. Chrysler, former chief inspector, and Benjamin Predenza, former cleaning department head, are charged with seven counts of a nine count indictment with intentionally producing defective aluminum aircraft castings.

These indicted men, pleading not guilty, had been criticized by the Packard Motor Car Co., Detroit, according to District Attorney Miller, but persisted in producing defective castings.

Attorneys representing the National Bronze & Aluminum Foundry Co., as now constituted, denied knowledge of such acts and pleaded not guilty to any of the counts.

NON-FERROUS METALS

Refiner, Smelter Quotations

(Cents per lb.)

Copper, electrolytic, Conn. Valley.....	12.00
Copper, electrolytic, New York.....	11.75
Copper, Lake	12.00
Tin, Straits, New York.....	52.00
Zinc, East St. Louis.....	3.25
Zinc, New York	3.67
Lead, St. Louis	6.35
Lead, New York	6.50
Aluminum, virgin 99+%, delivered....	15.00
Nickel, electrolytic, base refinery.....	35.00
Magnesium, 99.9+%, carlots	21.50
Magnesium, 12-in. sticks, carlots.....	30.00
Cadmium, delivered	90.00

ALUMINUM, No. 12 foundry grade (No. 2), 13.50c. per lb.; steel deoxidizing grades, 12.50c. to 13.75c. per lb. **ANTIMONY, Asiatic, New York, nominal;** American, 14.50c. a lb. f.o.b. Laredo, Tex., smelter. **MERCURY**, \$191 to \$193 per 76-lb. flask, f.o.b. shipping point or port of entry. **BRASS INGOTS, commercial** 85-5-5-5 (No. 115), 12.25c. a lb. **COBALT**, 97 to 99 per cent, \$2.11 per lb. **BERYLLIUM COPPER**, 3.75 to 4.25 per cent Be, \$15 per lb. contained Be. **GOLD, U. S. Treasury**, \$35 an oz. **IRIDIUM**, 99.5 per cent, \$10 per troy oz. **IRIDIUM**, \$165 per troy oz. **PALLADIUM**, \$24 per troy oz. **PLATINUM**, \$35 per oz. **SILVER**, open market, New York, 44.75c. per oz. **ARSENIC**, prime, white, 99 per cent, 4c. per lb.

Copper, Copper Base Alloys

(Mill base prices)

Sheet: Copper, 20.87c.; high brass, 19.48c.; low brass, 80 per cent, 20.15c.; lead brass, 85 per cent, 20.36c.; commercial bronze, 90 per cent, 21.07c., 95 per cent, 21.28c.; manganese bronze, 28.00c.; Muntz metal, 22.75c.; naval brass, 24.50c.; phosphor bronze, grades A, B, 5 per cent, 36.25c.; Everdur, Herculo, Olympic or equivalent, 26.00c.; nickel silver, 5 per cent, 26.50c.

Rods: Copper, hot rolled, 17.37c.; drawn, 18.37c.; free cutting brass, 15.01c.; low brass, 80 per cent, 20.40c.; red brass, 85 per cent, 20.61c.; commercial bronze, 90 per cent, 21.32c., 95 per cent, 21.53c.; Muntz metal, 18.87c.; naval brass, 19.12c.; phosphor bronze, grades A, B, 5 per cent, 36.50c.; Everdur, Herculo, Olympic or equivalent, 25.50c.; nickel silver, 5 per cent, 28.75c.

Extruded Shapes: Copper, 20.87c.; architectural bronze, 19.12c.; manganese bronze, 24.00c.; Muntz metal, 20.12c.; naval brass, 20.37c.

ALUMINUM

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. per lb. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c. per lb.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base price for tubing; 30,000-lb. base price for plate, flat stock. Variations from the above gage, size, temper, finish and quantity require extras.

Extruded Shapes: "As extruded" temper; 2000-lb. base price. 2S and 3S, factor No. 1 to 4, 25.5c. per lb.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by the weight per lineal foot. All prices above are subject to factor number range, temper, length, dimensional tolerances and quantity extras.

Wire, Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in.

thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Variation from the above size, temper, finish and quantity require extras.

NON-FERROUS SCRAP METAL QUOTATIONS

Copper, Copper Base Alloy

(Current OPA maximum prices, cents per lb., f.o.b. point of shipment, plus premiums for quantities and special preparation.)

OPA Group 1

No. 1 wire, No. 1 heavy copper..	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper.	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
Lead covered copper wire, cable..	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings.	10.50
Tinny (phosphor bronze) solids..	10.50
Copper-nickel solids and borings..	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)..	9.00
Gliding metal turnings	8.50
Unlined standard red car boxes ..	8.25
Lined standard red car boxes ..	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings ..	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

OPA Group 3

Yellow brass soft sheet clippings.	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	8.00
Old rolled brass	7.75
Admiralty condenser tubes	8.00
Muntz metal condenser tubes	7.50
Plated brass sheet, pipe reflectors	7.50
Manganese bronze solids	7.25*
	6.25*
Manganese bronze borings	6.50*
	5.50*

OPA Group 4

Automobile radiators	7.00
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OPA Group 5

Refinery brass	5.00*
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*Price varies with analysis. †Lead content 0.00 to 0.40 per cent. ‡Lead content 0.41 to 1.00 per cent.

MAGNESIUM

Sheet, rod, tubes, bars and extruded shapes are subject to individual quotation. Magnesium Metal Turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c. a lb.

Aluminum

(Current OPA maximum prices, cents per lb., for less than 1000 lb. lots, f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Plant scrap, segregated

2S solids	9.00
All other solids	8.50
Borings and turnings	
Wrought alloys (17S, 18S, 32S, 52S)	7.50
High grade alloys	7.00
Low grade alloys	6.50

Plant scrap, mixed

All solids	7.50
Borings and turnings	5.50

Obsolete scrap

Pure cable	9.00
Old sheet and utensils	7.50
Old castings and forgings	8.00
Pistons, free of struts	8.00
Pistons, with struts	6.00
Old alloy sheet	7.00

For lots of 1000 to 19,999 lb., add 1c. to above prices except for old castings and forgings, pistons free of struts, pistons with struts and old alloy sheet for which there is a premium of ¼c. a lb. For lots over 19,999 lb. add 1½c. a lb. to prices listed.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	8.00

Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

(Current OPA maximum prices, cents per lb., f.o.b., shipping point.)

New zinc clippings, trimmings ...	7.25
Engravers', lithographers' plates..	7.25
Old zinc scrap	5.75
Unsweetened zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Soft and hard lead, including cable lead, f.o.b. point of shipment, deduct 0.55c. per lb. from basing point prices for refined metal.

Nickel

Nickel content 98 + per cent, copper under ¼ per cent. 26c. per lb.; 90 to 98 per cent nickel, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25½
Electrolytic, full size	22½
cut to size	30½
Rolled, oval, straight, 15 in. and longer	23½
Curved	24½
Brass: Cast, 32-20, elliptical, 15 in. and longer	23½
Zinc: Cast, 99.99, 16 in. and over	16½
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz. lots..	40.82-41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33.00
Zinc sulphate, 89% crystals, bbls.	6.80

Victory Scrap Banks Seen Helpful

••• A soon to be much publicized feature of the forthcoming scrap drive, the "Victory Scrap Banks," even though copied from our English allies, are regarded as one of the best ideas to have been introduced into scrap collecting so far as inducing public interest.

Even though the public is expected to contribute a small share of the total tonnage anticipated, the effects of public opinion and apathy, or lack of it, have a tremendous effect on the zeal shown by those who must produce

A story on auto graveyard results appears on page 72.

the tonnage. The salvage crews of every industrial plant and utility are made up of John Q. Public and his recognition of the urgency of the scrap campaign has a definite effect on his diligence.

One of the strongest deflating influences to public enthusiasm in last year's scrap campaign was the slow movement of piles of home salvage which stood about in public squares for long periods before moving to the mills. Changing the aspects of these

huge piles, which may reoccur, so that the public sees them as reservoirs stocked against a possible emergency is expected to help. Furthermore, the size of such piles, or Victory Scrap Banks, can be used as a competitive gage and a whip to urge collectors to greater effort.

Consuming steel mills and suppliers have on hand an inventory of about 7½ million tons, which will last only two months. The need for more iron and steel scrap is indicated in the production comparison of 1943 against 1942. Increase in the production of all munitions, all Navy tonnage and all merchant shipping is just double. Add to that the fact that shipments of iron ore are off from last year by more than 8,000,000 tons in the Great Lakes area due to the thirty-one days' delay in the opening of navigation this spring. An early closing or a late opening of the Lakes' navigation would further curtail the shipment of iron ore. Accordingly, many additional tons of iron and steel scrap may be required to maintain ingot steel capacity."

Overseas Scrap Preparation Suggested

••• A recommendation that preparation of battle scrap should be undertaken in the occupied zones of Africa and Italy has been made to THE IRON AGE by Max Stern, Loma Machine Mfg. Co., Inc., New York, who formerly operated large scrap treatment and shipwrecking yards in Europe. Present plans are to prepare military scrap, which is expected in monthly quantities of 20,000 tons, in this country.

However, Mr. Stern points out that the scrapping and dismantling of all types of scrap has been greatly developed in Italian harbors, due to the heavy use of scrap by Italy's steel industry. Many such facilities, with railroad sidings and water fronts could be used under military supervision, Mr. Stern said, employing Italian laborers, many of whom are already skilled in scrap preparation.

Mr. Stern pointed out that a large shipwrecking plant located in Bizerte is supplied with cranes and a plant for the manufacture of oxygen. Other smaller plants are located in Algiers, Palermo and in Southern Italy. Oxy-

gen plants, so necessary to cutting equipment, formerly operated by the French company, Air Liquide, are in Tunis, Algiers, Oran and Casablanca.

Among the advantages which would result from foreign preparation, Mr. Stern said, are savings in shipping and in U. S. scrap yard manpower. The scrap, arriving in well segregated lots, could be sold to dealers and shipped directly to consumers, similar to the method now followed by the Navy yards with their own segregated scrap.

Foreign prepared scrap could also be used to supply Italian steel works operated by the Allies.

BUFFALO—Dealers and consumers alike in the Buffalo district are hostile toward the WPB's projected scrap drive for Oct. 1. Some of the undesirable stuff salvaged last Autumn is still hanging around. Some dealers were stuck with large quantities for months. Also, cancellations on various alloy items and a consumer embargo on certain of these alloys worsened the situation. However, small gains were made in mill reserves, only the largest consumer complaining he had not yet piled up an ample stock.

BOSTON—Interest centers in the offering of 2000 tons of battlefield scrap, bids for which were taken this week (Sept. 21) and the pending scrap drive starting Oct. 1. Shipyard scrap is moving fairly well but otherwise business continues rather quiet, according to yards and brokers. There has been a modest shrinkage in the supply of shop scrap.

BIRMINGHAM—A very weak market continues to exist in this district. The larger steel scrap consumers are buying material but none of them is pressing for prompt shipment.

PITTSBURGH—Steel grades are becoming tighter here, with some plants continuing to dip into inventories. Some steel companies, which did little or no worrying about the scrap situation several months ago, are now reflecting the reverse opinion. All consumers are taking as much scrap as is available, and some remote material is beginning to come into the district. Optimistic hopes are centered on considerable help from the scrap drive which takes place next month. More serious, however, is the fact that most dealers yards are devoid of scrap. Small junkies have practically disappeared.

CINCINNATI—Although brokers and dealers continue to warn consumers of a tighter supply later in the year, no change in buying attitudes have been noted during the present week. Dealers so far, have been able to meet the steel mill demand, but tightness in No. 1 scrap material has forced melters to accept other grades. Steel mills generally, are in a fair condition with inventories running up as high as 90 days, but yard stocks are virtually non-existent, except in those instances where lack of labor has forced accumulation.

ST. LOUIS—The October drive for scrap will be opened here Sept. 27 with a meeting of dealers, users and government officials at the Mark Twain Hotel, with Edward Barringer, president, Iron and Steel Scrap Institute, as speaker. The trade is hopeful that it will bring results, as most users have been drawing heavily on reserves because of light receipts.

CLEVELAND—Scrap supplies in the Cleveland and Mahoning Valley areas are quite substantial, with mills attempting to develop at least a little backlog on inventories to start them into the Winter months. Cutbacks in contracts in the Ohio area resulted in an easing off of scrap shipments to the mills, since there was less of it being generated.

PHILADELPHIA—Shipments here have fallen to a minimum with machine shop turnings and cast scrap in great demand. Practically every foundry and steel mill is looking for cast scrap. Mills are beginning to complain that they are not getting the kind and amount of scrap they anticipated.

SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				Low Phos.		Heavy Structural and Plate			Foundry Steel				Alloy Free Low Phos.	Heavy Axle and Forge Turn.	Electric Furnace Bundles
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Bk. Shs. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, and Forge Crops	Bar Crops, Punching Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crank-shafts				
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	\$20.00	\$15.00	\$15.00	\$16.00	\$17.00	\$17.50	\$25.00	\$22.50	\$21.50	\$22.00	\$22.50	\$21.50	\$22.00	\$21.00	\$21.00	\$19.50	\$21.00	
Cleveland, Middletown, Cincinnati, Portsmouth, Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50	
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50	
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25	
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25	
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00	
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85	
Toledo, Ohio	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50	
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50	
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburgh, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00	
Minneapolis, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50	
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.50	15.00	12.50	14.00	15.50	

*Baled turnings are \$5 per gross ton higher.

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles. No. 3 bundles are \$2 less than No. 1 heavy melting.

AT NEW YORK CITY or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at \$14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.06 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 58c.; Alabama City, 26c.; Minneapolis, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakmont, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above

for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulls, slag reclaim, etc., of 85% or more Fe priced—\$2; 75 to 85% Fe—\$4; under 75% Fe—\$8 per ton. Mill scale of 65% or more Fe—\$8 per ton. Mill cinder and grindings, shipping point maximum price of \$4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP

	Scrap Rails					
	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown.....	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington.....	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco.....	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo.....	20.25	21.25	22.75	23.25	23.50	23.75
Detroit.....	18.85	19.85	21.35	21.85	22.10	22.35
Duluth.....	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.....	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.....	19.25	20.25	21.75	22.25	22.50	22.75
Seattle.....	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis.....	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	\$18.00	\$19.00	\$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

Type	BASE PRICE SEGREGATED		Type	BASE PRICE UNSEGREGATED SOLIDS		Type	BASE PRICE UNSEGREGATED TURNINGS	
	Solids, Lb. Cont. W	Turnings, Lb. Cont. W		1.50 per lb. contained W if 5% or more.	1.30 per lb. contained W if 5% or more.		1.00 per lb. contained W if 1% and less than 5%.	0.70 per lb. contained Mo if 1 1/2% or more.
Type 1	\$1.80	\$1.60	Type 1	\$1.15 per lb. contained W if over 1% and less than 5%.		Type 2		
Type 2	1.60	1.40	Type 2			Type 3		
Type 3	1.25	1.25	Type 3			Type 4*		
Type 4*	0.125	0.165	Type 4*	\$0.80 per lb. contained Mo if 1 1/2% or more.		Type 5*		
Type 5*	0.135	0.115	Type 5*					

*Per lb. of scrap material.

Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.10	2.10	2.10	2.10
Plates, wrought iron.....	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic...	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars.....	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Heavy rails.....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails.....	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Rerolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Wire rods.....	2.00	2.00	2.00	2.00
Skelp (grv'd).....	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 139-151.

Pig Iron: (Per Gross Ton)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
No. 2 fdy., Philadelphia...	\$25.84	\$25.84	\$25.89	\$25.89
No. 2, Valley furnace....	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.68	24.68	24.68	24.68
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.39
Basic, Valley furnace....	23.50	23.50	23.50	23.50
Malleable, Chicago†....	24.00	24.00	24.00	24.00
Malleable, Valley.....	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	31.34
Ferromanganese†.....	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Furnace coke, prompt...	\$6.50	\$6.50	\$6.50	\$6.00
Foundry coke, prompt...	7.50	7.375	6.875	6.875

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Sept. 21, 1943	Sept. 14, 1943	Aug. 24, 1943	Sept. 22, 1942
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd..	15.00	15.00	15.00	15.00
Nickel, electrolytic.....	35.00	35.00	35.00	35.00
Magnesium, ingot.....	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

Composite Prices . . .

FINISHED STEEL		PIG IRON		SCRAP STEEL	
Sept. 21, 1943.....	2.25513c. a Lb.....	23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One week ago.....	2.25513c. a Lb.....	23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One month ago.....	2.25513c. a Lb.....	23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One year ago.....	2.26190c. a Lb.....	23.61	a Gross Ton.....	\$19.17	a Gross Ton.....

HIGH		LOW		HIGH		LOW	
1943.....	2.25513c.,	2.25513c.,	\$23.61	\$23.61	\$19.17	\$19.17	
1942.....	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17	
1941.....	2.43078c.,	2.43078c.,	\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10	
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9	
1939.....	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16	
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7	
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 9	
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9	
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29	
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25	
1933.....	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3	
1932.....	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5	
1931.....	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29	
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9	
1929.....	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.53, Jan. 29	14.08, Dec. 3	

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, mutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80¢		3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢	3.31¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.36¢	5.32¢
.50 } Electro tin plate, box	\$4.50	\$4.50	\$4.50												
	\$4.65		\$4.65												
.75 }															
Black plate, 29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ¹³			3.37¢
Mfg. ternes, special box	\$4.30	\$4.30	\$4.30						\$4.40						
BAR															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ ¹³	2.25¢	2.39¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢ ¹³	2.25¢		2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.65¢	2.31¢	2.29¢	2.15¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢							(Coatesville = 3.50¢)		3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
WIRE⁹															
Bright ¹⁴	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.92¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.70¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

¹ Mill run sheets are 10c per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 29,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Boxed. ¹² Portland and Seattle price, San Francisco price is 2.50c. ¹³ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base: Parkersburg Iron & Steel may quote \$2.25 per hundred f.o.b. Parkersburg, W. Va. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points; Parkersburg Iron & Steel may quote \$3.85 per hundred f.o.b. Parkersburg, W. Va. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at \$40.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at \$34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at \$34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at \$50 at established basing points and slabs at \$41; Empire Sheet and Tin Plate may sell slabs at \$41 at established basing points and sheet bars at \$39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge \$41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge \$36 per ton for small billets, f.o.b. Portsmouth and \$37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semi-finished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

PRICES

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, 2300	Hot Rolled, 3100	Cold Drawn, 2300	Cold Drawn, 3100
*Philadelphia	\$3.518	\$4.872 ⁵	\$5.018	\$3.922	\$4.772	\$3.605	\$3.666	\$3.822	\$4.072		\$7.116	7.303	8.453
*New York	3.580	4.613 ²	5.010	3.974 ⁶	4.774	3.768	3.758	3.853	4.103	6.008	7.158	7.344	8.494
*Boston	3.774	4.744	5.224	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.312		
*Baltimore	3.394	4.852	4.684	3.902	4.752	3.594	3.759	3.802	4.052				
*Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165				
*Washington	3.586	4.841	5.186	4.041	4.741	3.796	3.930	3.941	4.041				
*Chicago	3.25	4.20	5.23 ⁴	3.60	4.65 ⁵	3.55	3.55	3.50	3.75	5.75	6.90	6.85	8.00
*Milwaukee	3.387	4.337 ²	5.272 ⁴	3.737	4.787 ⁵	3.687	3.687	3.637	3.887	5.987	7.137	7.087	8.237
*Cleveland	3.35	4.40	4.877 ⁴	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.106	6.85	8.00
*Buffalo	3.35	4.40	4.75 ⁴	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.90	6.85	8.00
*Detroit	3.45	4.50	5.00 ⁴	3.70	5.909 ⁵	3.609	3.661	3.45	3.80	6.08	7.23	7.159	8.308
*Cincinnati	3.425	4.475 ²	4.825 ¹	3.675	4.711	3.611	3.691	3.611	4.011				
*St. Louis	3.397	4.247 ²	5.172 ⁴	3.747	4.931 ⁵	3.697	3.697	3.647	4.031	6.131	7.281	7.231	8.381
*Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	7.15	6.85	8.25
*St. Paul	3.51	4.46	5.257 ⁴	3.86	4.35 ⁵	3.81 ¹	3.81 ¹	3.76 ¹	4.361	6.09	7.24	7.561	8.711
*Omaha	3.565	5.443	5.608 ⁴	4.215		4.165	4.165	4.115	4.443				
*Indianapolis	3.58	5.38	4.918	3.768		4.78	3.63	3.58	3.98	6.08	7.23	7.18	8.33
*Birmingham	3.45 ³		4.75 ¹	3.70 ³		3.55 ³	3.55 ³	3.50 ³	4.43				
*Memphis	3.85	4.68	5.25	4.10		3.95	3.95	3.90	4.31				
*New Orleans	3.95	4.95	5.25	4.20		3.90	3.90	4.10	4.60				
*Houston	3.75	5.43	5.25	4.30		5.25	5.25	3.75	4.50				
*Los Angeles	4.95	7.15	5.95	4.90		4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
*San Francisco	4.85	7.55	6.80	4.50		4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
*Seattle	4.65 ⁷	6.63	5.70 ⁷	4.25		4.75	4.45	4.20	5.75		8.00		

NATIONAL EMERGENCY (N. E.) STEELS (Hot Rolled Mill Extras for Alloy Content)

Designa- tion	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Man- ganese	Phos- phorus Max.	Sulph- ur Max.	Silicon	Chro- mium	Nickel	Molyb- denum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	\$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40	8.00		
NE 9260	.55/ .65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9261	.55/ .65	.75/1.00	.040	.040	1.90/2.20	.10/ .25			.65	13.00		
NE 9262	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.25/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	\$25.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9425	.23/ .28	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9545*	.43/ .48	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9261	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.10/ .25						
NE 9425	.23/ .28	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15				
NE 9545	.43/ .48	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25				

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over: Ex- ceptions: † 500 to 1499 lb. * 400 to 1499 lb. * 400 to 3999 lb. * 450 to 1499 lb. * 1000 to 1999 lb. * 0 to 1999 lb. † 300 to 10,000 lb. * 2000 to 39,999 lb. * 400 to 14,999 lb. At Philadelphia galvanized sheets, 2500 more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb.; galvanized and cold rolled sheets, 750 to 4999 lb.; cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lbs.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

†† For zoned cities these grades have been revised to NE 8617-20.

‡ For zoned cities these grades have been revised to NE 9442-45 Ann'd.

* Base delivered prices according to price zones established by Amendments to RPS 49 including the 3% transportation tax—not including the 6% freight increase of March 18, 1942, rescinded May 15, 1943.

*Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; f.o.b. Duluth, billets only, \$2.00 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00
Alloy steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	\$54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.	
Prices delivered Detroit are \$2.00 higher.	

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57 1/2c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.



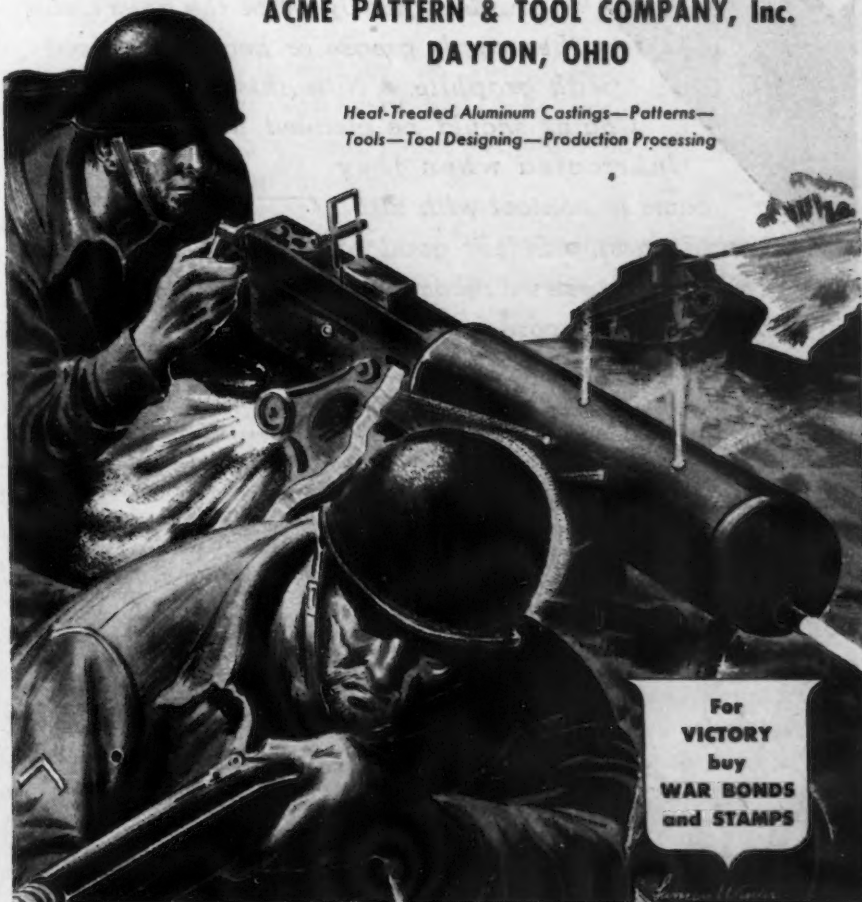
Today's war of movement goes into even faster action as the 'round-the-clock allied air attacks soften up enemy-prepared positions, blast supply lines and wreck armament plants.

Here at Acme, we're also in action—24 hours a day. Every previous record in producing tools, patterns, and heat-treated aluminum castings has been broken. And new records have a very short life. For the faster we work, the more we help war production plants to deliver fighting tools on time.

An experienced staff of engineers is a vital part of the Acme organization. Why not let us see if we can help you eliminate any bottlenecks that may be lessening production in your plant?

ACME PATTERN & TOOL COMPANY, Inc.
DAYTON, OHIO

Heat-Treated Aluminum Castings—Patterns—
Tools—Tool Designing—Production Processing



For
VICTORY
buy
WAR BONDS
and STAMPS



Clean and lubricate your chain!

LENGTHEN ITS LIFE

Here's one good method. Clean your chains regularly. Wipe the links clean, then apply grease or heavy oil mixed with graphite. • Note this exception: Chains should be cleaned but not be lubricated when they come in contact with dirt and sand. • Select good chain (of course we recommend American), care for it regularly, and you'll obtain excellent service. • The highest possible preference rating should be obtained and shown on orders placed for chain.

• USE WELDLESS CHAINS

Weldless Chain is being substituted successfully in many applications, for smaller sizes of welded chain and manila rope. From time to time we have open equipment for manufacturing the following types of weldless chains and attachments: Tenso, Lock-link, Jack, Register, Safety, in steel and brass; American Pattern, in steel; Sash, in steel and bronze. Attachments—"S" hooks, rope snaps, swivel snaps, rings and special designs. Write for information.

AMERICAN CHAIN DIVISION

YorK, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT • CONNECTICUT



PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent Off List
1/2 in. & smaller x 6 in. & shorter	65 1/2
9/16 & 5/8 in. x 6 in. & shorter	63 1/2
3/4 to 1 in. x 6 in. & shorter	61
1 1/8 in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

1/2 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/8 to 1 1/2 in. inclusive	57
1 3/8 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	64	64
1/2 in. and smaller	62	60
1/2 in. through 1 in.	60	60
9/16 to 1 in.	59	58
1 1/8 in. through 1 1/2 in.	57	58
1 3/8 in. and larger	56	56

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 70
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (1/2 in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
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Small Rivets (7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
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Cap and Set Screws

Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	58
Flister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.	
No. 1 O.H., gross ton	\$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	Per Gross Ton
Light rails (from billets)	\$40.00
Light rails (from rail steel)	39.00
Base per Lb.	
Cut spikes	3.00c
Screw spikes	5.15c
Tie plates, steel	2.15c
Tie plates, Pacific Coast	2.30c
Track bolts	4.75c
Track bolts, heat treated, to railroads	5.00c
Track bolts, jobbers, discount	63-3

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 30-rod spools in carload quantities.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	25	3½
¾ in.	30	10
1 and 1½ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 8 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.



ROLL ON **ABBOTT**
Bearing **BALLS**

EAT-UP "TOUGH JOBS"

Heavy duty assemblies don't furnish all the "tough jobs" for ABBOTT BEARING BALLS to accomplish. Many light, intricate mechanisms require ABBOTT exacting precision plus stamina.

ABBOTT BEARING BALLS for years have been successfully competing and winning against friction and, so called, tough load carrying jobs.

ABBOTT BEARING BALLS do what is expected of them. The daily applications in countless types of both light and heavy duty mechanisms prove conclusively—ABBOTT for "tough jobs".

KEEP 'EM ROLLING

on ABBOTT BEARING BALLS

WRITE ABBOTT for the grade of ball to match your standard of precision—we will gladly supply estimates of delivery.

ROLL ON **ABBOTT** *Bearing* **BALLS**
THE ABBOTT BALL COMPANY HARTFORD, CONN. U.S.A.

PRICES

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	\$25.50	\$25.00	\$26.50	\$25.50		
Brooklyn	27.50			28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia	25.84	25.34	26.84	26.34	\$30.74	
Bethlehem, Pa.	25.00	24.50	26.00	25.50		
Everett, Mass.††	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.	25.00	24.50	26.00	25.50	29.50	
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50	26.00	25.50		
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpsville, Pa.*	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati, Ohio	23.94	23.94		25.11		
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.86	
St. Louis	24.50	24.50				
Chicago	24.00	23.50	24.50	24.00	35.46	\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00	32.42	
Hamilton, Ohio	24.00	23.50	24.50	24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00	32.42	
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc.						\$34.00
Lyles, Tenn. fc.†						33.00
St. Paul	26.76		27.26	26.76	39.80	
Duluth	24.50	24.00	25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles	26.95					
San Francisco	26.95					
Seattle	26.95					
Provo, Utah	22.00	21.50				
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace\$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorus iron; high-phosphorus sells for \$28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$2 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge \$30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

Metal Powders

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cents per lb.

Copper, electrolytic, 150 and 200 mesh	21½ to 23½c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh	13½ to 15c.
Iron, crushed, 200 mesh and finer.	4c.
Iron, hydrogen reduced, 300 mesh and finer	63c.
Iron, electrolytic, unannealed, coarser than 300 mesh	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh	42c.
Iron, carbonyl, 300 mesh and finer	90c.
Aluminum, 100 and 200 mesh.	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	\$1
Chromium, 150 mesh	\$1.03
Lead, 100, 200 & 300 mesh, 1½ to 12½c.	
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh, 8½c. plus metal	
Tin, 100 mesh	58½c.

*Freight allowed east of Mississippi.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Hot Drawn	Hot Rolled	Lap Weld
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38	
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58	
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35	
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15	
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66	
(Extras for less carload quantities)				
40,000 lb. or ft., and over	Base			
30,000 lb. or ft. to 39,999 lb. or ft.	5%			
20,000 lb. or ft. to 29,999 lb. or ft.	10%			
10,000 lb. or ft. to 19,999 lb. or ft.	20%			
5,000 lb. or ft. to 9,999 lb. or ft.	30%			
2,000 lb. or ft. to 4,999 lb. or ft.	45%			
Under 2,000 lb. or ft.	65%			

CUTS the Toughest Steels and Largest Sizes easily.

This giant hydraulic metal-cutting saw is more than just a larger hack saw. It is a new development in metal-cutting methods that introduces a new principle of metal sawing — the Roll-stroke blade action makes it possible to cut the toughest steels in the largest sizes easily and rapidly. It also permits a simple and efficient, very low pressure Hydraulic Feed System.

Built for heavy work, completely enclosed in heavy housing, this machine will stand up under the rough usage of the average steel mill warehouse and forge shop, where it will speed cutting-off, and reduce material loss.

Write for Catalog

MARVELSAWS

ARMSTRONG-BLUM MFG. CO. Eastern Sales Office
 "The Hack Saw People" 225 Lafayette St.,
 5700 Bloomingdale Ave., Chicago, U. S. A. New York

PRICES

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer, 51.50	\$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.15
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

COKE

Furnace

	Per Net Ton
†Connellsville, prompt	\$6.50*

Foundry

†Connellsville, prompt	7.50
Fayette County, W. Va. (Beehive)	8.10
By-product, Chicago	12.25
By-product, New England	13.75
By-product, Newark	12.40 to 12.95
By-product, Philadelphia	12.38
By-product, Cleveland	12.30
By-product, Cincinnati	11.75
By-product, Birmingham	8.50†
By-product, St. Louis	12.02
By-product, Buffalo	12.50

Maximum by-product coke prices established by OPA became effective Oct. 1, 1941.

*Hand-drawn ovens using trucked coal are permitted to charge \$7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.o.b. oven.

FLUORSPAR

Pursuant to OPA Revised Maximum Price Regulation No. 126, effective July 1, 1943, to Aug. 29, 1943, base price per short ton is set at \$33 for 70 per cent or more effective CaF₂ content; \$32 for 65 but less than 70 per cent; \$31 for 60 but less than 65 per cent; and \$30 for less than 60 per cent. F.o.b. consumer's plant (1) plus either railroad freight on such shipment from the producer's shipping point to the consumer's plant, or (2) railroad freight on such a shipment from Rosiclare, Ill., to the consumer's plant, which ever is lower. On and after Aug. 30, 1943, the maximum price f.o.b. a consumer's plant on any shipment of metallurgical grade fluorspar shall be \$30 per short ton. Over \$30 may be charged provided the producer receives specific instructions from the Steel Division of WPR to the effect that a specific consumer must have one of the higher grades, as provided in Section No. 4 (b).

REFRACTORIES

(F.o.b. Works)

	Per 1000
Fire Clay Brick	
Super-duty brick, St. Louis	\$64.60
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania and Birmingham	\$51.30
Chicago District	58.40
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard, chemically bonded, Balt., Plymouth Meeting, Chester	\$54.00

Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

LEWIN-MATHES *Got the right answer at*

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.



IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING...

"Ask ETNA About Swaging"

ETNA

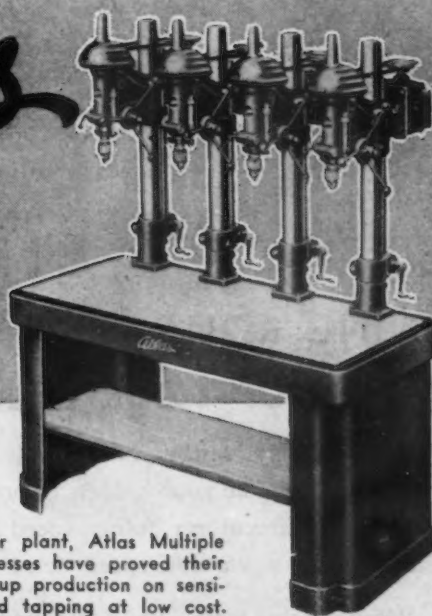
MACHINE COMPANY

TOLEDO

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Atlas

MULTIPLE-SPINDLE DRILL PRESS



In plant after plant, Atlas Multiple Spindle Drill Presses have proved their ability to step up production on sensitive drilling and tapping at low cost. Drill heads are the accurate Atlas SKF ball bearing equipped floating-drive design. Special head-positioning mechanism cuts set-up time. Massive production oil table simplifies moving of jigs and fixtures. Available with two, three or four spindles.

ATLAS PRESS COMPANY

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LATHES • DRILL PRESSES • ARBOR PRESSES • SHAPERS • MILLING MACHINES

BRONZE BEARINGS OILLESS BRONZE BEARINGS GEAR BLANKS MACHINED BRONZE PARTS

S & H Bronze Bearings can be furnished in any size or quantity to meet your particular requirements.

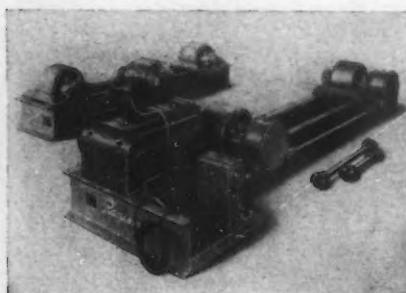
Our equipment and manufacturing methods enable us to meet the most exacting specifications and design.

INDUSTRIAL



BEARINGS

S. & H. Bearing and Manufacturing Co., Inc.
340-344 North Avenue, East
Cranford New Jersey



TURNING ROLLS CAN STEP UP YOUR CYLINDER WELDING...

For manual or automatic welding . . . here's the equipment that will enable your welders to produce at their top capacity. Smooth rotation at any desired speed . . . forward or reverse . . . is provided by a variable-speed drive with push-button control.

Work ranging from 2 to 14 feet diameter can be accommodated by shifting the position of the rollers.

Other Ransome Positioners include types and capacities for handling weldments of any size.

POSITIONING PAYS...WRITE FOR LITERATURE

Ransome WELDING POSITIONERS

INDUSTRIAL DIVISION • RANSOME MACHINERY COMPANY • DUNELLEN, NEW JERSEY

PRICES

Ferromanganese

78-82% manganese, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn. Carload lots (bulk)\$135.00
Ton lots (packed) 141.00
Less ton lots (packed) 148.50
Premium, \$1.70 for each 1% above 82%
Mn; penalty, \$1.70 for each 1% below 78%.

Electrolytic Manganese

99.9% manganese, maximum base contract price per lb. of metal, bulk, f.o.b. shipping point, with freight allowed to destination. Size, 1" x D.
Eastern Central Western
Zone Zone Zone
Carload lots 37.60c. 37.85c. 38.15c.
L.c.l. lots .. 39.60c. 38.60c. 40.65c.

Spiegeleisen

Maximum base contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
16-19% Mn 19-21% Mn 26-28% Mn
1% max. Si 1% max. Si 1% max. Si
Carloads \$35.00 \$36.00 \$49.50
Less ton* 47.50 48.50 62.00

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% silicon ...	6.65c.	7.10c.	7.25c.
75% silicon ...	8.05c.	8.20c.	8.75c.

Spot sales 45c. per lb. higher for 50% Si; 30c. for 75% Si. For extras and premiums see MPR 405.

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)
F.o.b. Jackson, Ohio\$29.50*
Buffalo 30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe. 13.10c.	13.55c.	16.50c.	
97% Si, 1% Fe. 13.45c.	13.90c.	16.80c.	

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

	Eastern Zone	Central Zone	Western Zone
Car lots ...	3.35c.	3.50c.	3.65c.

Spot prices ¼c. higher per lb. of briquet. For premiums and extras see MPR 405.

Silicomanganese

(Per gross ton, delivered, carloads, bulk)
3.00 carbon\$120.00*
2.50 carbon 125.00*
2.00 carbon 130.00*
1.00 carbon 140.00*
Briquets, contract, basis carlots, bulk freight allowed, per lb... 5.80c.†
Packed 6.05c.†
Less ton lots 6.58c.†

*Spot prices are \$5 per ton higher.
†Spot prices ¼c. higher.

Ferrochrome

(65-72% Cr, 2% max. Si)
OPA maximum base contract prices per lb. of contained Cr, lump size in carlots, f.o.b. shipping point, freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
0.03% carbon ..	25.00c.	25.40c.	26.00c.
0.06% carbon ..	23.00c.	23.40c.	24.00c.
0.10% carbon ..	22.50c.	22.90c.	23.50c.
1.00% carbon ..	20.50c.	20.90c.	21.50c.
2.00% carbon ..	19.50c.	19.90c.	20.50c.

Spot prices are ¼c. higher per lb. contained Cr. For extras and premiums see MPR 407.

PRICES

Other Ferroalloys

Ferrotungsten, delivered, carlots, per lb. contained tungsten	\$1.90
Tungsten metal powder, 98%-99%, any quantity, per lb.	\$2.60
Ferrovanadium, 35%-40%, contract basis, f.o.b. producers plant, usual freight allowances, open-hearth grade, per lb. contained vanadium	\$2.70
Special grade	\$2.80
Very special grade	\$2.90
Vanadium pentoxide, 88%-92% V ₂ O ₅ technical grade, contract basis, any quantity, per lb. contained V ₂ O ₅	\$1.10
Ferrobaboron, contract basis, 17.50% boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy	\$1.20
Ton lots	\$1.25
Silicaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	23c.
Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	40c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over, maximum based on rate to St. Louis, per lb.	45c.
Bortam, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Borosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio, per lb. contained boron	\$7.00
Ferrocolumbium, 50% to 60%, f.o.b. Niagara Falls, ton lots, per lb. contained columbium ...	\$2.25
Less ton lots	\$2.30
Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained titanium	\$1.23
Less ton lots	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	\$1.35
Less ton lots	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per gross ton	\$142.50
3%-5% carbon	\$157.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	95c.
Calcium molybdate, 40%-45%, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum ..	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo.	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo.	80c.
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. Under 100 lb.	\$2.60 \$3.00
Zirconium, 35-40%, contract basis, carlots in bulk or package, per lb. of alloy	15c.
Less ton lots	16c.
Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton	\$102.50
Packed	\$107.50
Less ton lots	\$112.50
Alisifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb. ...	7.50c.
Ton lots	8c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, carlots, f.o.b. Phila., Ohio, per lb. ton lots	9.50c.
Less ton lots	10.50c.



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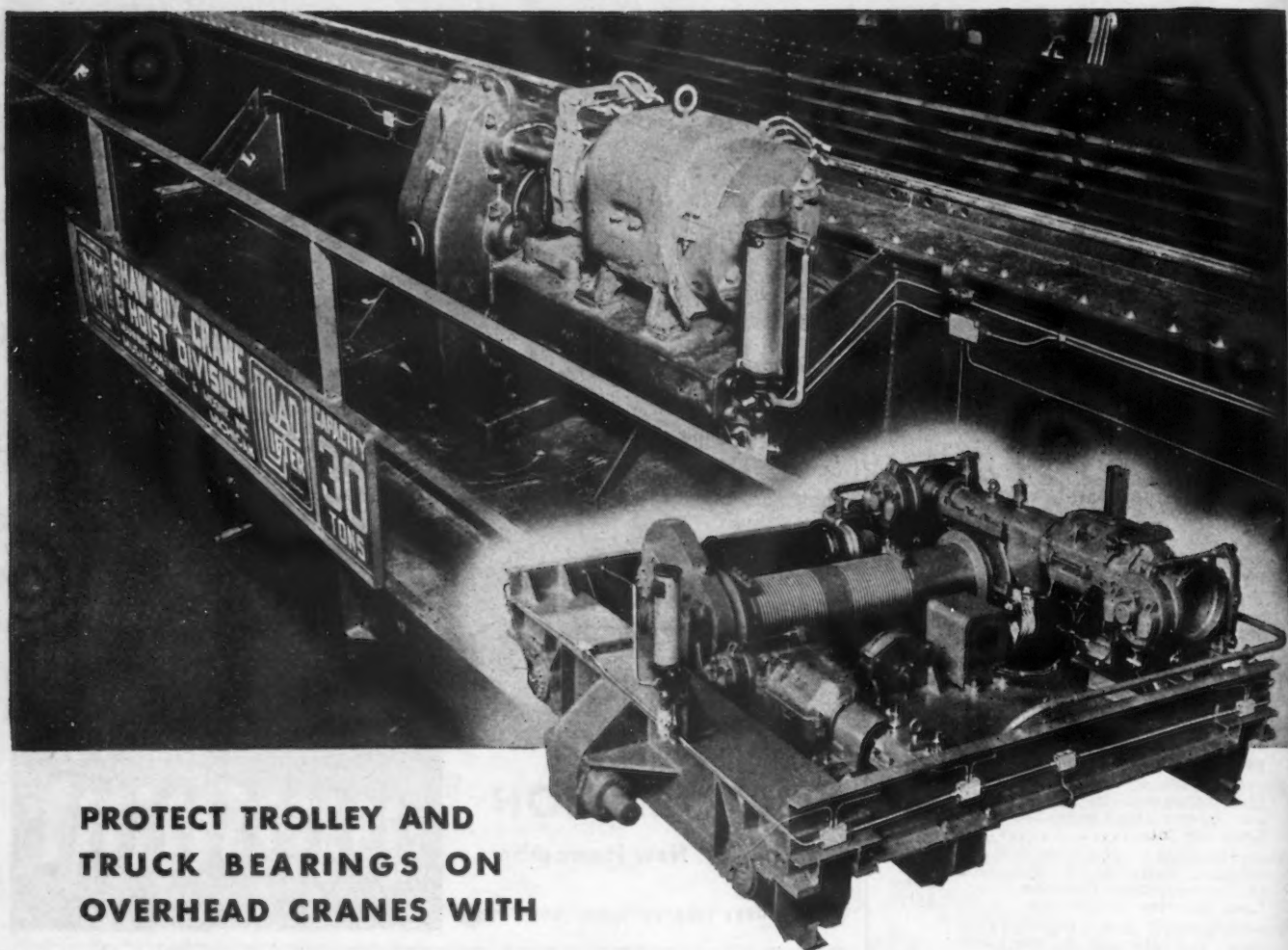
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